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PILGRIM RESTART READINESS ASSESSMENT REPORT

VOLUME 1 OF 2

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
475 ALLENDALE ROAD
KING OF PRUSSIA, PENNSYLVANIA 19406

SEP 27 1988

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ATTN: Ms. Janice Neubauer
147 St. George Street
Duxbury, Massachusetts 02332

Dear Ms. Neubauer:

This letter forwards a copy of the Nuclear Regulatory Commission (NRC) Pilgrim Restart Assessment Panel's Restart Readiness Assessment Report for the Pilgrim Nuclear Power Station (PNPS).

Please place this material with the copy of the PNPS Restart Plan and Self-Assessment Report, which were previously provided, and make it available for public review.

Thank you for your continuing cooperation in this matter.

Sincerely,

Samuel J. Collins, Deputy Director
Division of Reactor Projects

Enclosures:
As stated

cc w/o encls:
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APPENDIX A
NDIX B
ENDIX C
ENDIX D

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
475 ALLENDALE ROAD
KING OF PRUSSIA, PENNSYLVANIA 19406

SEP 26 1988

MEMORANDUM FOR: William T. Russell
Regional Administrator

FROM: Samuel J. Collins, Chairman
Pilgrim Restart Assessment Panel

SUBJECT: PILGRIM RESTART RECOMMENDATION

The memorandum from W. F. Kane to you dated July 8, 1987, established the Charter for the Pilgrim Restart Assessment Panel. In accordance with that Charter, this forwards the Panel's Report documenting its conclusions and their bases concerning the Boston Edison Company's (BECo) readiness to restart the Pilgrim Nuclear Power Station (PNPS) from a management effectiveness and technical perspective.

Based on the extensive and comprehensive review documented in the enclosed Restart Readiness Assessment Report, it is the consensus view of the Panel that the management and technical problems existing at the time of shutdown in April 1986 have been resolved. Further, the Panel concludes that BECo's management controls, programs, and personnel are generally ready and performing at a level to support safe startup and operation of the Pilgrim Nuclear Power Station.

The Pilgrim Restart Assessment Panel therefore recommends authorizing restart of the Pilgrim Nuclear Power Station pending BECo's completion and NRC inspection and closeout of those issues identified as restart items in the enclosed report.

Samuel J. Collins, Chairman
Pilgrim Restart Assessment Panel

Enclosure:
As stated

SEP 26 1988

cc w/encl:
R. Bird, Senior Vice President - Nuclear, BECo
Chairman, Board of Selectmen, Plymouth
Chairman, Board of Selectmen, Carver
Chairman, Board of Selectmen, Duxbury
Chairman, Board of Selectmen, Marshfield
Chairman, Board of Selectmen, Kingston
The Honorable Edward P. Kirby
The Honorable Peter V. Forman
The Honorable Edward J. Markey
Plymouth Civil Defense Director
P. Agnes, Assistant Secretary of Public Safety, Commonwealth of Massachusetts
M. Ernst, Committee on Energy, Commonwealth of Massachusetts
S. Pollard, Energy Secretary, Commonwealth of Massachusetts
B. McIntyre, Chairman, Department of Public Utilities
N. Johnson, Chairman, Duxbury Nuclear Committee
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NRC Resident Inspector
Commonwealth of Massachusetts (2)

RESTART READINESS ASSESSMENT REPORT

FOR

PILGRIM NUCLEAR POWER STATION

PREPARED BY

UNITED STATES NUCLEAR REGULATORY COMMISSION

PILGRIM RESTART ASSESSMENT PANEL

DATED: SEPTEMBER 26, 1988

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1.0 EXECUTIVE SUMMARY

In December 1985, the NRC Systematic Assessment of Licensee Performance (SALP) Board concluded the Boston Edison Company's (BECo) performance was marginal in several functional areas. A followup diagnostic team inspection confirmed the SALP Board findings and identified four principal factors inhibiting progress. In April 1986, a series of recurrent technical problems caused a plant shutdown. Confirmatory Action Letter (CAL) No. 86-10 was issued on April 12, 1986, requiring a written report on the licensee's evaluation of the technical issues surrounding the shutdown and NRC Region I Administrator's approval for restart. Subsequently, due to the number of outstanding hardware, program, and management issues, the CAL was extended in August 1986, to require that the licensee submit a formal assessment of the readiness for restart and a formal restart program and schedule.

The Boston Edison Company has devoted considerable resources and commitment towards correcting the long-term hardware, program, and management problems at the Pilgrim Nuclear Power Station (PNPS). The licensee has made organizational structure changes, extensive management changes, and staffing increases. All key management positions are filled and essentially all are permanent employees. The new management team has a significantly improved nuclear safety ethic. The licensee has performed a series of self-assessments to identify and address problem areas. These self-assessments resulted in various action plans to improve performance. In addition to the program and management improvements, the licensee performed extensive maintenance and modifications on plant equipment to improve the material condition of PNPS. Most notable were the modifications to enhance the Mark I containment performance. The licensee also decontaminated ninety percent of the plant. BECo has performed a Restart Readiness Self-Assessment (RRSA) and developed a Power Ascension Test Program (PATP), both of which have been submitted to the NRC. During the RRSA, the licensee identified several issues requiring resolution, some of

which were categorized as restart items. The licensee has developed a schedule and has been progressing on correcting the restart items. Based on the results of the RRSA, on June 25, 1988, BECo requested the NRC perform an independent review of BECo's restart readiness. In order to assess the status and results of BECo's corrective actions, the NRC performed an independent review of the effectiveness of the licensee's management controls, programs and personnel during an Integrated Assessment Team Inspection (IATI) conducted August 8-24, 1988.

The NRC has devoted significant inspection resources and senior management attention to Pilgrim since January 1986. Over 17,000 direct inspection hours have been expended and programmatic inspections have been performed in all areas. All the technical issues associated with CAL 86-10 and its supplement have been resolved and are awaiting retest during the Power Ascension Program. NRC staff review of the BECo Restart Plan, the Self-Assessment Report, and the Power Ascension Test Program has been completed. The 1987 SALP and the IATI noted improved performance in all functional areas. Specifically, the IATI concluded with high confidence that BECo management controls, programs, and personnel were generally ready and performing at a level to support safe startup and operation of PNPS. Further, although the inspection identified certain items which require licensee actions or evaluations, there were no fundamental flaws found in the licensee's management structure, management performance, programs, or program implementation that would inhibit its ability to assure reactor or public safety during plant operation. Also, the four performance improvement inhibitors noted during the 1986 diagnostic team inspection were found to be corrected.

Based on BECo's corrective actions and the NRC staff's review, the technical and management issues existing at the time of the shutdown have been resolved or adequately addressed. The Pilgrim Restart Assessment Panel recommends authorizing plant restart pending licensee's completion of the RRSA and IATI identified restart items and subsequent NRC review.

2.0 INTRODUCTION

The Pilgrim Nuclear Power Station (PNPS) has remained shutdown since April 12, 1986, for the Boston Edison Company (BECo) to make hardware, staffing, and program improvements. This Readiness Assessment Report summarizes BECo's actions to address the technical issues leading to the shutdown in April 1986, and other long-term management problems. Specifically, the actions taken by BECo in response to the Confirmatory Action Letter No. 86-10 and other changes made to improve management, programs and plant hardware are discussed in Sections 4.0 and 5.0, respectively. This report also provides, in Sections 6.0 through 9.0, an overview of NRC inspection and other review activities performed to evaluate the adequacy of BECo's corrective actions and programs. Most notable were the 1987 Systematic Assessment of Licensee Performance (SALP), Section 7.0, which concluded BECo's management initiatives have been generally successful in correcting staffing, organization and material deficiencies and that programmatic improvements were noted in areas of previously identified weakness; and the NRC Integrated Assessment Team Inspection (IATI), Section 8.0, which concluded there were no fundamental flaws in the licensee's management, structure, performance, programs, or program implementation that would inhibit its ability to assure reactor or public safety during plant operation. The 1987 SALP and IATI validated the effectiveness of BECo management and program improvements and form the primary bases for the NRC staff's conclusion and recommendation regarding the licensee's restart readiness.

3.0 BACKGROUND

The 1985 Systematic Assessment of Licensee Performance (SALP) Board found BECo's performance was marginal in several functional areas with a recurrent theme of inadequate personnel staffing and inadequate supervisory oversight at the plant. Also, the SALP Board noted, historically, BECo's inability to sustain improved performance once achieved. A Diagnostic

Team Inspection (Report No. 50-293/86-06), conducted in February and March 1986 to determine the underlying reasons for BECo's poor performance, confirmed the 1985 SALP Board's conclusions and found four principal factors inhibiting progress. These were: (1) incomplete staffing, in particular, operators and key mid-level supervisory personnel; (2) a prevailing view in the organization that the improvements made to date had corrected the problems; (3) reluctance, by management, to acknowledge some problems identified by the NRC; and (4) dependence on third parties to identify problems rather than implementing an effective program for self-identification of weaknesses.

Following a series of operational events on April 11 and 12, 1986, which resulted in a plant shutdown, Confirmatory Action Letter (CAL) No. 86-10 was issued on April 12, 1986, which required BECo provide a written report on the technical problems encountered during those events which included the intersystem leakage resulting in the pressurization of the Residual Heat Removal (RHR) system, the spurious primary containment isolation, and the inability to reopen the Main Steam Isolation Valves (MSIV's) following the isolation. The CAL also required BECo obtain NRC Regional Administrator authorization prior to plant restart. In conjunction, the 1985 SALP transmittal letter dated May 23, 1986, established periodic management meetings between NRC and BECo to discuss the scope, content and schedule of improvement programs addressing the SALP identified, long-term hardware, program, and management problems. Due to the number and scope of the outstanding issues, the CAL was supplemented, in an August 27, 1986 letter, to require BECo to submit a formal assessment of the readiness for restart operation, and a formal restart program and schedule.

A copy of CAL No. 86-10 and the August 27, 1986 supplement are attached to this report as Appendix A.

4.0 CONFIRMATORY ACTION LETTER NO. 86-10

Confirmatory Action Letter (CAL) No. 86-10 and the August 27, 1986, supplemental letter, identified certain technical issues which required resolution prior to restart. In addition, the supplemental letter required BECo submit to the NRC prior to restart approval (1) a formal assessment of the readiness for restart operation which included a detailed checklist for assuring all outstanding items were satisfactorily resolved and plant systems were restored and prepared for operation; and, (2) a formal restart program and schedule which contained appropriate hold points requiring NRC Regional Administrator approval to proceed. The following discussion summarizes BECo's actions in response to the CAL and supplemental letter and the NRC review of these activities.

4.1 Resolution of Technical Issues

Confirmatory Action Letter (CAL) No. 86-10 required BECo to provide a written report to the Regional Administrator, prior to restart, containing the licensee's evaluation of: (1) the intersystem leakage through the motor-operated injection valves (including the check valve) of the residual heat removal (RHR) system; (2) the primary containment isolation which occurred during shutdown after the reactor mode switch was repositioned from the run mode to the startup mode; and, (3) the failure of the outboard main steam isolation valves (MSIVs) to reopen after resetting the primary containment isolation signal. The report was to include the underlying causes for the above events, corrective actions taken, and the basis for restart.

The NRC reviewed BECo's written response to the CAL. In addition, there were several management meetings held to discuss the results of the licensee's evaluations and corrective actions. Licensee action on each of the issues has been inspected. The RHR intersystem leakage and the MSIV failure to reopen issues have been resolved. Inspection Report No. 50-293/87-46 documents NRC review of the spurious primary containment isolation. The inspection found the licensee's inspections, analysis, and actions on this issue were extensive and exhaustive; however, the exact cause of the isolation has yet to be determined. These actions included replacing the mode switch, and physical inspection and walkdowns of primary containment isolation system relays, contacts, and wiring. The licensee will attempt to duplicate the isolation, under controlled conditions and with extensive instrumentation monitoring to capture transient signals, during the Power Ascension Program using Test Procedure 86-81. The procedure has been reviewed by the NRC for adequacy. This issue remains open pending completion of Test 86-81.

A summary listing of the correspondence documenting the followup and resolution of the CAL 86-10 technical issues is provided in Appendix B to this report.

The August 27, 1986 supplement to CAL 86-10 identified four additional technical issues requiring resolution prior to restart. These issues of concern were: overdue surveillances, malfunction of the recirculation motor generator set field breakers, seismic qualification of emergency diesel generator differential relays, and completion of fire protection system modifications pursuant to 10 CFR 50, Appendix R. These issues have all been inspected and resolved. Appendix B to this report also references the inspection report closing these concerns.

In addition to the issues discussed above, on November 24, 1986, a management meeting was held with BECo senior management at the NRC Region I Office to discuss the licensee's plans for program improvements at Pilgrim and the status of outage activities. During this meeting, NRC conveyed to the licensee that significant improvement was needed in several areas including staffing, control of overtime, fire protection, physical security, surveillance testing, and radiological protection programs. The meeting minutes (Report No. 50-293/86-41) dated December 31, 1986 included a list of programmatic concerns and other technical issues at Pilgrim as of November 24, 1986 which NRC would review prior to restart for evidence of progress. As requested by the staff, the licensee formulated a schedule for completion of corrective actions to address these issues and submitted periodic status updates to the NRC.

All forty-seven programmatic and technical issues identified in Management Meeting No. 86-41 have been adequately addressed by the licensee. Independent review of these issues by the NRC is documented in various inspection reports, the 1987 SALP report, and the Integrated Assessment Team Inspection. The minutes of Management Meeting No. 86-41, which contains the list of issues discussed above annotated to show closeout references, are attached as Appendix C to this report.

4.2 Boston Edison Company (BECo) Restart Plan

On July 30, 1987, the licensee submitted the PNPS Restart Plan. The Restart Plan described the programs, plans, and actions considered necessary by BECo management for the safe and reliable restart and continued operation of PNPS. It concentrated on specific activities to correct and prevent recurrence of weaknesses previously identified by NRC, the Institute of Nuclear Power Operations (INPO), and BECo.

The Restart Plan consisted of two volumes. Volume 1 provided primarily a programmatic description of BECo's restart efforts while Volume 2 consisted of a set of Appendices that identified specific issues, action items, and the status to date. Specifically, Appendix 10 to the Restart Plan, "Restart Regulatory Commitments," contained action items to address Systematic Assessment of Licensee Performance (SALP) (Report No. 50-293/86-99), CAL 86-10, and Management Meeting 86-41 issues as well as other commitments made in response to NRC inspections or other NRC-BECo correspondence. Restart Plan Volume 2, Revision 1 (updated results) was submitted on October 26, 1987, and Appendix 7 to Volume 2, "Summary Status of Restart Actions in the Radiological Action Plan (RAP)," was submitted January 4, 1988.

In January 1988, a multi-disciplined task force consisting of NRC Region I and Headquarters personnel was formed to review the Restart Plan for adequacy in addressing NRC concerns. Following several staff level discussions with the licensee and various letters requesting clarification or additional information, the staff concluded that the Restart Plan provided a suitable framework for responding to the NRC's request for a self evaluation of restart readiness. The correspondence documenting the staff's review and acceptance of the Restart Plan is attached as Appendix D to this report. In general, the effectiveness of the licensee's implementation of the Restart Plan action items was verified during followup inspections of the source document (i.e., CAL 86-10 or Management Meeting 86-41 technical issues), as well as during the Systematic Assessment of Licensee Performance (Report No. 50-293/87-99) and the Integrated Assessment Team Inspection (IATI).

The NRC also held a public meeting in Plymouth, Massachusetts, on February 18, 1988, to obtain public comments on the Restart Plan. These comments, and any that were received by mail, were factored into the task force review. A second public meeting was held by the NRC in Plymouth, Massachusetts on May 11, 1988, to provide feedback to the public on the comments received during the first meeting or by mail.

4.3 Boston Edison Company's (BECo's) Self-Assessment

A Management Meeting (Report No. 50-293/88-10) was held on February 24, 1988, in the NRC Region I Office to discuss the BECo self-assessment process designed to determine readiness for requesting restart permission. The licensee conducted their restart readiness self-assessment from April 19 to May 2, 1988, and submitted the "Pilgrim Nuclear Power Station Self-Assessment of Readiness for Restart Report" to the NRC on May 26, 1988. In the report, BECo identified several plant and equipment performance, operational performance, and management and organization matters which required specific action before restart.

The NRC staff conducted a detailed onsite review during June 20-24, 1988, of BECo's self-assessment process and the basis for the conclusions. The restart readiness self-assessment was performed by BECo Nuclear Organization Management under the auspices of the Management Assessment and Oversight Team (MO&AT). MO&AT consists of eight senior level managers and is chaired by the Senior Vice President - Nuclear. The licensee's readiness self-assessment began with line manager presentations to MO&AT on the current status of the Restart Plan, the Material Condition Improvement Action Plan and Radiological Action Plan items; the INPO action items; SALP 86-99

concerns; and relevant NRC inspection findings or BECo experience since the SALP. This was supplemented by MO&AT observations during plant and system walkdowns, personnel interviews, simulator observations, and information from the peer evaluator, management monitoring and QA surveillance programs to develop a list of issues requiring further followup action, some of which were categorized as restart items.

Overall, the NRC staff found that: (1) BECo's self-assessment process appeared thorough and MO&AT was effective in screening a number of diverse inputs on plant and program status to develop and prioritize issues requiring resolution; (2) BECo had established, and plans to continue, various programs which were effective in assessing program and personnel performance; and (3) BECo had established plans and programs to satisfy the CAL 86-10 requirement for checklists to assure all outstanding items are satisfactorily resolved and plant systems properly restored for operation. In a letter dated July 11, 1988, the NRC staff concluded that BECo had satisfied the NRC-request to provide a self evaluation of restart readiness as described in the August 27, 1986 update of CAL 86-10. A copy of the July 11, 1988 letter, and the staff's report on the review of BECo's restart readiness self-assessment are attached as Appendix E to this report.

4.4 Boston Edison Company's Power Ascension Program

The August 27, 1986 update to CAL 86-10 included the requirement for BECo to submit a formal restart program and schedule with appropriate hold points to the NRC for review and approval. The licensee submitted the proposed Power Ascension Program on October 15, 1987. In a letter dated February 29, 1988, BECo responded to an NRC request for additional information dated January 28, 1988. A management meeting was held on April 8, 1988 in the NRC Region I Office to discuss NRC

concerns regarding the licensee's Power Ascension Program. During this meeting, three issues were identified as requiring additional NRC review: analysis of the effect of plant modifications on the dynamic response of the plant; review of approved Test Procedures (TP) No. 87-114 and 87-147; and evaluation of Rosemount transmitter "ringing" concerns. "Ringing" is a characteristic system response, in the form of hydraulic oscillations at resonant frequency, to an appropriate stimulus. Several inspections were conducted on the adequacy of the Power Ascension Program and procedures which resolved the first two issues. The Rosemount transmitter concerns were resolved based on the information provided in a BECo letter dated August 4, 1988 and in a NRC-licensee meeting held on August 31, 1988 at the NRC Region I Office.

In a letter dated September 7, 1988, the NRC staff concluded that the licensee's Power Ascension Program provides an adequate plan which satisfies the NRC's request for a formal restart program and schedule. Further, the five proposed hold points, (i.e., points requiring NRC approval to proceed) as proposed in a supplemental BECo submittal dated August 31, 1988, were approved. The hold points allow for NRC evaluation of plant equipment and personnel performance, after the licensee has completed a self-evaluation. The Power Ascension Program, NRC requests for additional information, BECo responses, and the NRC acceptance letter are attached to this report as Appendix F.

5.0 STATUS OF BOSTON EDISON COMPANY ACTIVITIES

5.1 Organization and Management

The Boston Edison Company has devoted considerable resources and attention to correcting both the technical issues which led to the shutdown in April 1986 and the management problems which kept the

plant shutdown. Significant organizational structure changes were made to clearly define responsibilities and authority; strengthen certain areas such as planning, maintenance, and operations; and elevate other critical functions such as Emergency Planning. Extensive management changes were made and staffing levels were increased in all areas. Some of the notable organizational and personnel changes include: establishing the onsite Plant Systems Engineering Group; appointment of a new Senior Vice President - Nuclear and establishing his office onsite; appointment of a Station Director; recruiting experienced personnel from outside sources to assume various management positions including the plant manager and section head or group leader positions in operations, security, fire protection, radiological protection and emergency preparedness; and aggressively recruiting reactor operator candidates. All key management positions are filled and essentially all are permanent employees.

The licensee performed a series of self-assessments to identify/verify problem areas and to determine the desired conditions. For each issue identified, corrective actions were established, specific closure criteria developed, and responsibilities assigned. These assessments resulted in the Restart Plan, the Material Condition Improvement Action Plan (MCIAP), and the Radiological Action Plan (RAP). The Restart Plan contained the programs, plans, and actions considered necessary for the safe and reliable restart and continued operation of PNPS, concentrating on specific activities to correct and prevent recurrence of previously identified weaknesses. The MCIAP and RAP, containing both restart and long-term actions, established programs to achieve long-term improvement in the material condition and overall quality of maintenance and radiological controls at PNPS. As discussed above, the staff reviewed the licensee's readiness self-assessment process and concluded the licensee was effective in assessing program and personnel performance. The effectiveness of BECo's self-assessment and the new management team's performance, including its ability to change previously held attitudes at

PNPS, was reviewed and evaluated during the SALP and IATI. Overall, it was noted that improvement has been made and that there were no fundamental flaws in the BECo's management structure, management performance, programs, or program implementation that would inhibit its ability to assure reactor or public safety during plant operation.

5.2 Plant Equipment

During this outage, BECo completed extensive plant and procedure modifications. The licensee's Safety Enhancement Program included addition of a third emergency diesel generator, containment spray header nozzle changes, installation of a backup nitrogen supply system, and additional protection features for anticipated transient without scram including the enriched boron modification to the standby liquid control system. (Installation was also begun on a direct torus vent system and on a diesel driven fire pump tied to the residual heat removal system. The completion date of these two modifications is unknown; however, neither is required for restart.) Licensee modifications to the fire protection program and equipment were made to bring the plant into compliance with 10 CFR 50, Appendix R requirements. Additional modifications include a new process computer, an analog trip system, and improved reactor level instrumentation. A hydrogen water chemistry system was also installed to inject hydrogen into the reactor coolant to minimize intergranular stress corrosion cracking of reactor internal components and the associated piping.

In addition to the modifications noted above, BECo overhauled both emergency diesel generators; overhauled the high pressure coolant injection and reactor core isolation cooling system turbines; overhauled the main turbine; and disassembled and inspected the residual

heat removal and core spray system pumps and motors. Also, the licensee initiated a major plant decontamination program (with goals) such that 90% of the plant is now accessible without any protective clothing.

The licensee completed refueling in October 1987. The reactor vessel hydrostatic test and the containment integrated leak rate test were both successfully completed in December 1987. Currently all major testing or maintenance scheduled to be completed before restart has been completed.

6.0 INSPECTION PROGRAM STATUS

The NRC has devoted considerable inspection resources to Pilgrim, expending over 17,000 direct inspection hours since January, 1986. The resident staff has been maintained at three inspectors since February 1987, and programmatic inspections have been conducted in all SALP functional areas. The following sixteen special team inspections have been performed at Pilgrim since early 1986: (1) Region I Diagnostic Team Inspection in February-March 1986; (2) Emergency Planning remedial drill observation in January and April 1986; (3) Augmented Inspection Team (AIT) review of operational events in April 1986; (4) Radiological Improvement Program appraisal in October 1986; (5) Anticipated Transient Without Scram Generic Letter (83-28) review in August 1986; (6) Annual emergency plan exercise observation in December 1986; (7) Appendix R Fire Protection Program review in May 1987; (8) Plant modification program review in August 1987; (9) Plant effluent and environmental monitoring program review in October 1987; (10) AIT review of the loss of offsite power event in November 1987; (11) Annual emergency plan exercise in December 1987; (12) Onsite electrical distribution adequacy review in February 1988; (13) Emergency Operating Procedures review in March 1988; (14) Maintenance program review in April-May 1988; (15) In-Plant Radiological Controls

review in May 1988; and, (16) Integrated Assessment Team Inspection in August 1988. Two sets of licensed operator examinations were administered to a total of two senior reactor operators and fourteen reactor operators, with all candidates successfully completing the licensing process. Appendix G to this report provides a list of inspection activities at Pilgrim since January 1986.

An NRC Order issued in 1984 requiring the licensee to implement a Radiation Improvement Program was closed in November 1987 based on the results of a special inspection and other program inspections which indicated that all terms of the Order had been satisfactorily completed. An enforcement conference was held in September 1987, to discuss security related matters. Although enforcement action on these security issues is still pending, the concerns involved have been adequately resolved by the licensee.

In July 1987, a Pilgrim Restart Assessment Panel was formed which consists of senior NRC management from Region I and the Office of Nuclear Reactor Regulation (NRR). The Panel generally met bi-weekly to coordinate the planning and execution of all NRC activities regarding Pilgrim, and to assess the results of these activities to provide an independent judgement of the plants' readiness for operation. The Panel meetings are often held at the site to provide opportunities for the panel members to tour the facility and meet with members of the licensee staff as well as the resident inspectors.

Senior NRC management involvement at Pilgrim has been substantial since early 1986. Frequent site tours by NRC Commissioners, the Director of the Office of Nuclear Reactor Regulation, and the Regional Administrator were conducted. A series of management meetings with the licensee was held. NRC senior management participated in numerous public meetings in

Plymouth, Massachusetts and interacted extensively with local, state and federal officials. Additionally, the Regional Administrator will hold a local public meeting before acting on the restart panel recommendation. The Advisory Committee on Reactor Safeguards has met to discuss the proposed plant restart. A chronological listing of management meetings, public meetings and tours is included in Appendix H.

7.0 SYSTEMATIC ASSESSMENT OF LICENSEE PERFORMANCE (SALP)

The performance of BECo hs been assessed twice under the NRC SALP program since the April 1986 shutdown. The SALP Boards met on March 2, 1987 and on July 5-6, 1988.

The March 1987 SALP Board meeting covered the period of November 1, 1985 through January 31, 1987. Twelve functional areas were evaluated. The Board found that performance improvements were still needed to correct long-term problems in the areas of Radiological Controls, Surveillance, Fire Protection, Security, and Assurance of Quality. The lack of a clear organizational structure, recurring management changes, and chronic staffing vacancies delayed the establishment of a stable licensee management team at the plant and inhibited progress during the assessment period. However, performance appeared to improve at the end of the period, reflecting staffing improvements and resource commitments. The SALP also noted that plant hardware changes, particularly the planned Mark I containment enhancements, were impressive and showed a concern for nuclear safety.

The July 1988 SALP Board meeting covered the period of February 1, 1987 through May 15, 1988. Eleven functional areas were evaluated. The SALP Board noted that BECo was aggressive in addressing areas of known program weakness. The licensee efforts were extensive and included corporate and site reorganizations and a new management team which undertook numerous projects and programs to improve plant material condition and enhance programmatic performance. Programmatic performance improvements were evident

in the areas of Surveillance, Fire Protection, Security, and Assurance of Quality. Each of these areas improved from a Category 3 rating in 1987 to Category 2 in 1988. Although it remained a Category 3, improvements in the organization, programs, and performance were also noted late in the assessment period in the area of Radiological Controls such that the SALP Board assigned a trend of "improving." The licensee sustained the improvements (noted in the previous SALP) in the areas of Plant Operations, Emergency Preparedness, and Training at the Category 2 level. Continued performance at the Category 1 level was noted in Engineering and Technical Support.

A Pilgrim SALP rating history is attached to this report as Appendix I. The Systematic Assessment of Licensee Performance (SALP) Report No. 50-293/86-99 dated June 17, 1987 and the SALP Board Report No. 50-293/87-99, dated July 27, 1988, are attached as Appendices J and K, respectively.

8.0 INTEGRATED ASSESSMENT TEAM INSPECTION

As discussed in Section 3.0 above, BECo developed a comprehensive Restart Plan containing the programs, plans, and actions considered necessary by BECo management for the safe and reliable restart and continued operation of PNPS. BECo performed an in-depth self-assessment of the effectiveness of that Plan. On June 25, 1988, BECo reported it had completed these activities to the extent that an NRC review was appropriate. In order to assess the status and results of the licensee's corrective actions, the NRC performed an independent review of the effectiveness of the licensee's management controls, programs and personnel during an Integrated Assessment Team Inspection (IATI) conducted August 8-24, 1988. A copy of the IATI Report (No. 50-293/88-21) is attached to this report as Appendix L.

The inspection covered a variety of functional areas, including operations, maintenance, surveillance, radiation protection, security, training, fire protection, and assurance of quality. Particular emphasis was placed on management effectiveness and on the status of the licensee's recent program improvements in maintenance. The inspection consisted of interviews with licensee personnel, plant tours, observations of plant activities, and selective examination of procedures, records and documents. The inspectors also directly observed ongoing plant activities on all shifts from August 10-13, 1988. Over 1100 hours of direct inspection time was expended during the IATI.

The fifteen member team consisted of an SES level manager, a team leader, five shift inspectors and several specialist inspectors from NRC Region I and Headquarters. Two representatives from the Commonwealth of Massachusetts were also on the Team as observers throughout the inspection.

The IATI confirmed the 1988 SALP Board findings of improved licensee performance in the areas which were previously identified as weak. It was concluded that the licensee's management controls, programs, and personnel were generally ready and performing at a level to support safe startup and operation of the PNPS. In addition, the IATI focused on those conditions described in the NRC's 1986 Diagnostic Inspection report which were impediments to licensee performance improvements. The IATI found that these conditions either no longer existed or were substantially ameliorated. Although the IATI identified certain items which require licensee actions or evaluations, there were no fundamental flaws found in the licensee's management structure, performance, programs, or program implementation that would inhibit its ability to assure reactor or public safety during plant operation.

9.0 OTHER RELATED INSPECTION AND REVIEW ACTIVITIES

9.1 Licensing Actions

Since Pilgrim shutdown in April 1986, the NRC has completed about 75 licensing actions. These actions include routine technical specification changes, exemptions, and safety evaluations. Many of these licensing actions would have been taken regardless of the operating status of the facility, and reflect BECo actions in response to NRC generic requirements, TMI Action Plan items, or self-initiated facility changes.

Approximately 20 of these actions were specifically required to allow the facility to restart from the extended outage. Some of the more significant actions involved areas such as:

-- Fire Protection. Exemptions and technical specification amendments were issued to reflect the as-built condition and the extensive fire protection modifications accomplished during the outage. As a result of the modifications, technical specification changes and exemptions, the Pilgrim facility will be in compliance with fire protection requirements when the one open licensing action noted below is complete.

-- Core Reload. A technical specification amendment was issued to reflect the refueling completed in October 1987.

-- Containment. A technical specification amendment was issued to reflect the changes to containment isolation valves, including addition of the hydrogen injection system valves, accomplished during the outage.

-- Safety Enhancement Program. Portions of the safety enhancement program (SEP) implemented by BECo required changes to the technical specifications (changes to the standby liquid control system and the automatic depressurization system logic). Other portions of the SEP were reviewed by the staff, at its discretion, to determine the acceptability of changes implemented by the licensee under the provisions of 10 CFR 50.59. Examples include the direct torus vent, blackout diesel generator, and modifications to provide additional sources of water for reactor coolant system injection and containment spray. The staff expects to complete its assessment of the SEP initiatives in the near future; however, it should be noted that none of these modifications are restart requirements and those changes affecting the containment will provide Pilgrim with a containment that exceeds present staff requirements.

-- Organization and Administrative. A technical specification amendment was issued to reflect changes to the organizational structure and staffing.

-- Degraded Voltage Protection. A technical specification amendment was issued to change certain setpoints for degraded voltage protection.

-- Emergency Operating Procedures. A review was performed of the Procedure Generation Program (PGP) and associated emergency operating procedures, written to Revision 4 of the Boiling Water Reactor Owner's Group Emergency Procedure Guidelines (EPGs). The Pilgrim emergency operating procedures, coupled with improvements made under the SEP, place them in the forefront of the industry in their capability to respond to severe accidents.

The one remaining licensing action noted below is to be completed by the staff prior to authorization of facility restart:

-- Fire Barriers with Ratings Less Than Three Hours. Revise a license condition to reflect fire protection engineering evaluations performed to support the acceptability of certain fire barriers having a rating less than three hours.

The staff has reviewed the status of all remaining licensing actions (approximately 20) involving the Pilgrim facility and has determined that none of these actions are required to be completed prior to restart. This number of licensing actions is typical of operating BWRs.

9.2 Status of 10 CFR 2.206 Petitions

9.2.1 Massachusetts State Senator William B. Golden, et. al

On July 15, 1988, Massachusetts State Senator William B. Golden filed a Petition with the NRC on behalf of himself and others regarding Pilgrim Nuclear Power Station (PNPS). The Petitioners requested a Show Cause Order that would have required Pilgrim to remain shutdown due to allegations of (1) numerous deficiencies in licensee management, (2) inadequacies in the existing radiological emergency response plan, and (3) inherent deficiencies in the design of the primary containment.

The Office of Nuclear Reactor Regulation Director's Interim Decision, signed on August 21, 1987, provided the following conclusions:

1. The NRC agreed with the Petitioners that significant management deficiencies have existed at Pilgrim Station. However, until the management deficiencies were suitably addressed by the licensee and the NRC staff completed its assessment, the Director could not issue a final decision regarding Pilgrim management. That portion of the Petition was to be addressed in a subsequent and Final Director's Decision.

2. The Petitioner's request for action due to inadequacies in the existing radiological emergency response plan was denied. However, the emergency planning issues identified by FEMA were a matter of serious concern to the NRC. The Commission will therefore consider, among other issues, those emergency planning issues in its deliberations on whether or not to allow Pilgrim to restart.

3. The information identified by the Petition did not warrant the initiation of the requested proceedings in regard to the containment issues, and the Petitioners' request on that issue was denied.

4. The NRC has required, and will continue to require, that the Pilgrim facility remain shutdown until the management and emergency preparedness issues are dealt with to the satisfaction of the NRC.

After receiving the Director's Interim Decision that denied their request for action on items (2) and (3) above, and deferred a decision on the management deficiencies, the Petitioners sought relief in the U.S. Court of Appeals for the First Circuit (Boston). On July 15, 1988, the Court

rendered its decision. To wit: the Director's Decision constitutes final agency action within the meaning of the applicable jurisdictional status. The court further held that given the lack of a meaningful standard of review in either the Atomic Energy Act of 1954, 42 U.S.C. §2011 et seq., or NRC regulations, the refusal of the NRC to issue a Show Cause Order against Boston Edison Company is not subject to judicial review.

The Director's Final Decision on this Petition is pending.

9.2.2 Massachusetts Attorney General James M. Shannon, et. al.

On October 15, 1987, Massachusetts Attorney General James M. Shannon and Governor Michael S. Dukakis jointly filed a Petition with the NRC requesting action by the Director to modify, suspend or revoke the operating license held by Boston Edison Company for Pilgrim Station. The request cites evidence of (1) continuing managerial deficiencies, (2) questions surrounding the containment (and therefore the need for a PRA), and (3) deficiencies in off-site emergency preparedness. The Petition also requested that Boston Edison be prevented from proceeding any further with the restart of Pilgrim until the Petition was resolved.

On May 27, 1988, a Director's Interim Decision was issued in response to the above referenced Petition that concluded:

1. The Petitioners did not identify any unique or unacceptable severe accident risk for the Pilgrim plant, nor document that such risk poses an unreasonable threat to public health and safety. Thus, Petitioner's request that restart be delayed until a PRA is conducted was determined to be without merit and was denied.

2. A decision was not made regarding the management issue; in part because the Petitioners provided no substantial new evidence that was not known to the NRC when it issued the Interim Decision to William B. Golden on August 21, 1987. That portion of the Petition was to be addressed in a subsequent response.

3. While the Petitioners alleged continuing deficiencies in emergency planning and preparedness at Pilgrim, they also acknowledged progress was being made in some areas. On balance, the Director chose to allow the licensee to pursue improvements in emergency planning, while ensuring the staff would continue to monitor that progress. Thus, a decision on the emergency preparedness issue was deferred.

4. The NRC has required, and continues to require, that Pilgrim remain shut down until the management and emergency preparedness issues are dealt with to the satisfaction of the NRC.

The Director's Final Decision on this Petition is pending.

9.3 Allegation/Investigation Status

Allegations of poor licensee work activities, safety deficiencies, and other areas of potential public health and safety concern are received and generally handled by the NRC Regional Office. Allegations received by Region I concerning Pilgrim have included concerns regarding both safety-related and non-safety-related areas. Each allegation received was assessed by Regional management and the Regional response to each allegation was determined by evaluation of its actual or potential safety significance. Significant allegations were investigated by members of the Office of Investigation or reviewed during inspections by Regional technical personnel.

As of September 20, 1988, thirty-four allegations have been received on Pilgrim since the April 1986 shutdown. Of these thirty-four allegations, six were substantiated in whole or part; however, none of the allegations presented a significant threat to the public health and safety. The licensee initiated procedural or hardware changes to correct the deficiencies noted. Of these thirty-four allegations, eight remain open. Three of these have been inspected, technically resolved, and are pending administrative closeout. A brief discussion of the remaining five open allegations is found below:

-- RI-87-A-0078 - Three Health Physics problems dealing with alpha contamination events; four security concerns regarding guard force manning and personnel access control. Region I's assessment and review have been completed. An inspection of the Health Physics related problems found that the Health Physics allegations were true but represented no health hazards. An inspection of the security concerns identified several violations. An Office of Investigations (OI) report was issued on this matter. Final enforcement action is under staff consideration.

-- RI-88-A-0064 - Private citizen indicated that she and others had specific information that proves BECo has been supplying the NRC with false information; alleger claimed she passed the information on to the Massachusetts Attorney General's Office. This allegation is vague in nature and responses requested by NRC for additional information regarding this allegation from the alleger and the Massachusetts Attorney General's Office are more than 30 days overdue.

-- RI-88-A-0071 - Executive Director of the Web of Life (WOL) Outdoor Education Center, an Emergency Preparedness shelter site, alleged that her signature was taken from a document she signed to an altered document: as a result, she had cancelled WOL's participation in the sheltering program. The allegation was just recently received and awaits NRC review and inspection.

-- RI-88-A-0074 - Certain Quality Control (QC) inspectors are performing electrical inspections even though they are not qualified to do so. The allegation was just recently received and NRC review and inspection is in progress. The scope of the allegation is limited to a definitive and narrow work activity.

-- RI-88-A-0088 - Private citizen received an anonymous call and package containing seven keys that allegedly allow access to various areas of the plant. This allegation was just recently received and awaits NRC review and inspection; however, it has been determined that the keys are not security, high radiation area or operations related keys.

None of the above allegations constitutes grounds for delaying restart of the Pilgrim Station prior to their resolution.

10.0 FUTURE ACTIONS

10.1 Boston Edison Company Actions

In addition to the normal pre-startup activities such as completing system valve lineups and surveillance testing, prior to restart, BECo must (1) complete those actions identified as restart items during the readiness self-assessment and (2) complete those corrective actions committed to in response to the IATI findings. BECo has reported the majority of the self-assessment restart actions are complete and the remainder, including issues such as procedure validation and modification training, would be complete by mid-October.

Those items remaining to be completed by BECo or pending NRC inspection and closeout are identified in Appendix M to this report. This Appendix will be updated prior to the Commission's deliberation on Pilgrim Restart.

Following restart, BECo must satisfactorily complete the Power Ascension Test program.

10.2 NRC Actions

In addition to the typical inspection activities performed before a startup following an extended outage, the NRC will complete the following activities prior to restart:

(1) Inspect the adequacy of BECo actions taken in response to the IATI findings (14 items);

(2) Inspect the adequacy of BECo actions on those previously identified inspection findings (OI's) classified by NRC as restart issues (3 items as of September 23, 1988);

(3) Issue additional Director Decisions on both outstanding 10 CFR 2.206 Petitions;

(4) Complete the remaining licensing action on fire barrier ratings;

(5) Conduct public meeting in the local area of the plant to discuss IATI results.

The status of these items will be evaluated before NRC staff recommends to the NRC Region I Administrator that the licensee be released from the first Power Ascension Program NRC approved holdpoint; i.e., reactor startup to criticality.

Following restart, the NRC will, in addition to maintaining the third resident inspector, provide for augmented inspection coverage, including some periods of around-the-clock inspection, during the Power Ascension Program; and perform a SALP about six months after restart.

11.0 CONCLUSIONS

The Boston Edison Company has devoted considerable resources and attention towards correcting the hardware, program, and management problems which existed at the time of the shutdown in April 1986. All of the technical issues associated with CAL 86-10 and Management Meeting 86-41 have been resolved or adequately addressed. Staffing problems have also been resolved. The organizational and personnel changes made during the outage have produced an effective management team which is capable of critical self-assessment, has an effective nuclear safety ethic, and has demonstrated the ability to improve attitudes and programs. The recent SALP and the IATI confirmed improvement has been made in all functional areas and confirmed that the conditions discussed in the 1986 diagnostic team

inspection which were, at the time, restraining program improvements have been removed or largely ameliorated. In addition, the IATI concluded that there were no fundamental flaws in the licensee's management structure, management performance, programs, or program implementation that would inhibit its ability to assure reactor or public safety during plant operation.

Based on the above, pending inspection and resolution of the IATI findings and other previous inspection findings designated as restart items, the Pilgrim Restart Assessment Panel recommends authorizing restart.

APPENDIX A

NDIX B

ENDIX C

ENDIX D

APPENDIX A

Confirmatory Action Letter (CAL) No. 86-10 and the August 27, 1986 Supplement

Letters	Subject
NRC to BECo, dated April 12, 1986	Confirmatory Action Letter No. 86-10, required written evaluation of technical problems and Regional Administrator authorization to restart.
NRC to BECo, dated August 27, 1986	Supplement to CAL 86-10; required formal assessment of readiness for restart and formal restart program.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
631 PARK AVENUE
KING OF PRUSSIA, PENNSYLVANIA 19406

April 12, 1986

CAL No.: 86-10
Docket Number: 50-293

Boston Edison Company M/C Nuclear
ATTN: Mr. William D. Harrington
Senior Vice President, Nuclear
800 Boylston Street
Boston, Massachusetts 02199

Gentlemen:

Subject: Confirmation of Actions to be Taken with Regard to the Pilgrim Plant Events Which Occurred on April 11-12, 1986

Pursuant to our telephone conversation on April 12, 1986 with Mr. Oxsen it is our understanding that you have taken or will take the following actions:

1. Maintain all affected equipment related to the events which occurred on April 11-12, 1986 in its as-found condition (except as necessary to maintain the plant in a safe shutdown condition) in order to preserve any evidence which would be needed to inspect or reconstruct the events.

2. Develop troubleshooting plans and procedures and provide those to the NRC Augmented Inspection Team (AIT) for their review and comment prior to initiating any troubleshooting of the affected equipment.

3. Advise the AIT leader prior to the conduct of any troubleshooting activities.

4. Make available to the NRC AIT relevant written material related to previous problems with the affected equipment.

5. Provide a written report to the Regional Administrator prior to restart that contains your evaluation of the following:

   a. Intersystem leakage through the motor-operated injection valves (including the check valve) of the residual heat removal system;

   b. The primary containment isolation which occurred during shutdown after the reactor mode switch was repositioned from the run mode to the startup mode;

c. The failure of the outboard main steam isolation valves to reopen after resetting the primary containment isolation signal.

This report should include the underlying causes for the above noted events, an assessment of their relationship to previous events including the events of April 4, 1986, corrective actions taken and your basis for restart, including the criteria used and your analyses associated with these criteria.

Further we understand that restart will not occur until you receive authorization from the Regional Administrator.

If your understanding of the actions to be taken are different than those described above, please contact this office within 24 hours of the receipt of this letter.

Thank you for your cooperation.

Sincerely,

Thomas E. Murley
Regional Administrator

cc: L. Oxsen, Vice President, Nuclear Operations
C. J. Mathis, Station Manager
Joanne Shotwell, Assistant Attorney General
Paul Levy, Chairman, Department of Public Utilities
Plymouth Board of Selectmen
Plymouth Civil Defense Director
Senator Edward P. Kirby
Public Document Room (PDR)
Local Public Document Room (LPDR)
Nuclear Safety Information Center (MSIC)
NRC Resident Inspector
Commonwealth of Massachusetts (2)
V. Stello, EDO
J. Taylor, IE
J. Sniezek, EDO
J. Zwolinski, NRR
P. Leech, NRR

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
631 PARK AVENUE
KING OF PRUSSIA, PENNSYLVANIA 19406

AUG 27 1986

Docket No. 50-293

Boston Edison Company M/C Nuclear
ATTN: Mr. James M. Lydon
Chief Operating Officer
800 Boylston Street
Boston, Massachusetts 02199

Gentlemen:

Subject: Confirmatory Action Letter 86-10

This letter is to provide further guidance on the requirements we expect to be met prior to the restart of the Pilgrim plant. We acknowledge receipt of Boston Edison Company's (BECO) letter of June 16, 1986, in response to Confirmatory Action Letter (CAL) 86-10. Your actions with regard to the issues in CAL 86-10 appear to be thorough and technically sound. My staff has a few remaining questions, which have been discussed with your staff and which will be documented in Inspection Report 50-293/86-25.

In addition to the specific plant hardware issues involved with CAL 86-10, several other issues have been identified that require resolution prior to restart of the Pilgrim plant. Specific technical issues of concern include: overdue surveillances, malfunction of recirculation motor generator set field breakers, seismic qualification of emergency diesel generator differential relays, and completion of Appendix R modifications. Please be prepared to discuss these issues at our next management meeting at the plant on September 9, 1986. We would also like to hear at this meeting the scope and status of all your programs related to restart of Pilgrim. These include (a) the results of your six week action plan for improvements, (b) the role of BECO safety review committees, including the Program For Excellence Task Force, in assessing readiness for restart, and (c) the readiness of the plant and corporate staff to support plant startup, testing, and operations.

In light of the number and scope of the outstanding issues, I am not prepared to approve restart of the Pilgrim facility until you provide a written report that documents BECO's formal assessment of the readiness for restart operation. This assessment should include your detailed check list for assuring that all outstanding items have been satisfactorily resolved and that plant systems have been restored and prepared for operation. A formal restart program and schedule should also be submitted for NRC review and approval. This program should include hold points at appropriate stages such as criticality, completion of mode switch testing, and at specific milestones during ascension to full power. Authorization to proceed beyond each hold point will be contingent upon my approval and will be based on my staff's evaluation of the operational performance of the plant. We will have substantially augmented NRC inspection coverage during this restart period.

Please plan to submit your readiness assessment and restart program and schedule at least forty-five days before your planned startup from the current outage. My decision on restart will be based in part on our review of these documents.

Your cooperation is appreciated.

Sincerely,

Thomas E. Murley

Thomas E. Murley
Regional Administrator

cc:
L. Oxsen, Vice President, Nuclear Operations
A. E. Pedersen, Station Manager
Paul Levy, Chairman, Department of Public Utilities
Edward R. MacCormack, Senior Regulatory Affairs and Program Engineer
Chairman, Board of Selectmen
Plymouth Civil Defense Director
The Honorable E. J. Markey
J. D. Keyes
Senator Edward P. Kirby
The Honorable Peter V. Forman
Sharon Pollard
Public Document Room (PDR)
Local Public Document Room (LPDR)
Nuclear Safety Information Center (NSIC)
NRC Resident Inspector
Commonwealth of Massachusetts (2)

bcc:
Region I Docket Room (with concurrences)
Management Assistant, DRMA (w/o encl)
Section Chief, DRP
W. Raymond, SRI, Vermont Yankee
T. Shedlosky, SRI, Millstone 1&2
H. Eichenholz, SRI, Yankee
P. Leech, LPM, NRR
PAO (2) SALP Reports Only
Robert J. Bores, DRSS
V. Stello
H. Denton
J. Taylor
T. Murley

APPENDIX B

NDIX C

ENDIX D

APPENDIX B

Chronology of CAL 86-10 Correspondence

APPENDIX B

Confirmatory Action Letter (CAL) No. 86-10

Chronology of Correspondence

The following documents identify the principal correspondence used to track, followup and resolve the CAL 86-10 technical issues.

	Letter	Subject
1.	NRC to BECo dated April 12, 1986	Confirmatory Action Letter No. 86-10
2.	BECo to NRC dated May 15, 1986	Response to CAL 86-10
3.	NRC to BECo dated May 16, 1986	Request for Additional Information (RAI) on Response to CAL 86-10
4.	NRC to BECo dated May 16, 1986	Inspection Report No. 50-293/ 86-17, Augmented Inspection Team review of April 4 and 12, 1986 operational events
5.	NRC to BECo dated June 10, 1986	Minutes of management meeting on May 19, 1986, to discuss BECo's response to CAL 86-10
6.	BECo to NRC dated June 16, 1986	Response to NRC RAI dated May 16, 1986
7.	NRC to BECo dated July 1, 1986	Minutes of management meeting on June 12, 1986, to discuss BECo response to CAL 86-10

Appendix B - CAL No. 86-10 Chronology
of Correspondence

	Letter	Subject
8.	NRC to BECo dated August 20, 1986	Minutes of management meeting on July 30, 1986, to discuss, among other issues, BECo corrective actions on CAL 86-10 issues
9.	NRC to BECo dated August 27, 1986	Supplemental requirements to CAL 86-10
10.	BECo to NRC dated August 29, 1986	Supplemental response to CAL 86-10
11.	BECo to NRC dated September 17, 1986	Additional information to the August 29, 1986 supplemental response
12.	NRC to BECo dated September 25, 1986	Inspection Report No. 50-293/86-25, forwarded NRC questions on CAL 86-10 response
13.	NRC to BECo dated September 29, 1986	Minutes of management meeting on September 9, 1986, to discuss, among other issues, CAL 86-10 issues
14.	NRC to BECo dated June 18, 1987	Inspection Report No. 50-293/87-22; Appendix R inspection
15.	NRC to BECo dated July 14, 1987	Inspection Report No. 50-293/87-26; closed concern on seismic qualification of emergency diesel generator differential relays

Appendix B - CAL No. 86-10 Chronology
of Correspondence

	Letter	Subject
16.	NRC to BECo dated November 3, 1987	Inspection Report No. 50-293/87-37; closed concern recirculation motor generator set field breakers
17.	NRC to BECo dated December 1, 1987	Inspection Report No. 50-293/87-42; closed concerns on RHR intersystem leakage
18.	NRC to BECo dated December 7, 1987	Inspection Report No. 50-293/87-46; updates concerns on spurious primary containment isolations
19.	NRC to BECo dated January 22, 1988	Inspection Report No. 50-293/87-41; closes concern on overdue surveillances
20.	NRC to BECo dated May 26, 1988	Inspection Report No. 50-293/88-13; closes concern on failure of MSIV's to reopen following isolation

APPENDIX C

ENDIX D

APPENDIX C

Management Meeting No. 50-293/86-41

Minutes dated December 31, 1986

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
631 PARK AVENUE
KING OF PRUSSIA, PENNSYLVANIA 19406

APPENDIX C

DEC 31 1986

Docket No. 50-293

Boston Edison Company M/C Nuclear
ATTN: Mr. James M. Lydon
Chief Operating Officer
800 Boylston Street
Boston, Massachusetts 02199

Gentlemen:

Subject: Management Meeting 50-293/86-41

We appreciated the opportunity to discuss your plans for program improvements at Pilgrim and the status of current outage activities at the management meeting on November 24, 1986. Our meeting report is attached.

We believe that the program changes you discussed, including the establishment of an on-site systems engineering group and management structure changes, have the potential to significantly improve your future performance. However, we are concerned by the slow response to some NRC findings and weaknesses in areas which were previously identified in our inspections and criticized during the 1985 Systematic Assessment of Licensee Performance (SALP). These areas include control of worker overtime, and the fire protection, security, and radiological protection programs. As we indicated in our letter dated November 6, 1986, we also do not believe that you are taking prompt action to resolve our concerns in the surveillance test program. In addition, the number of licensed reactor operators on shift is low and continues to decrease.

The NRC is looking for strong evidence of progress at Pilgrim prior to restart. Current performance is still weak in several areas and needs significant improvement. We have summarized many of the issues we plan to review prior to startup in Attachment 1 to this letter. The list is not all inclusive and we expect that we will add more issues to it. We anticipate that you will factor these issues into your restart plans. Our Senior Resident Inspector will discuss and further clarify these issues if you so desire. Further, you should note that we plan to complete a SALP review prior to reaching a position regarding the restart of the Pilgrim facility. Evaluation of your progress in resolving the issues listed in Attachment 1 will be an integral part of this SALP.

Consequently, please inform us in writing of your schedule for completion of your corrective actions to address the items in Attachment 1. Further, please advise us periodically of the status of your actions on these items as well as on the status of other startup issues that are subsequently identified.

The responses described in this letter are not subject to the clearance procedures of the Office of Management and Budget as required by the Paperwork Reduction Act of 1980, PL 96-511.

Your cooperation is appreciated.

Sincerely,

William Kane, Director
Division of Reactor Projects

Enclosures:
1. Attachment 1 - Partial List of Startup Issues
2. Attachment 2 - Management Meeting No. 50-293/86-41

cc w/encl:
L. Oxsen, Vice President, Nuclear Operations
A. Pedersen, Station Manager
Paul Levy, Chairman, Department of Public Utilities
Edward R. MacCormack, Senior Regulatory Affairs and Program Engineer
Chairman, Board of Selectmen
Plymouth Civil Defense Director
J. D. Keyes
The Honorable E. J. Markey
Senator Edward P. Kirby
The Honorable Peter V. Forman
Sharon Pollard, Secretary of Energy Resources
Public Document Room (PDR)
Local Public Document Room (LPDR)
Nuclear Safety Information Center (NSIC)
NRC Resident Inspector
Commonwealth of Massachusetts (2)

ATTACHMENT 1 TO APPENDIX C

Startup Issues

The following is a partial list of startup issues at Pilgrim as of November 24, 1986. Items are grouped according to SALP functional area.

1. OPERATIONS

A. Programmatic Concerns	Source Reference	Closeout Reference
Low Number of Licensed Operators	1985 SALP, 86-06	1987 SALP, 88-19, 88-21 (IATI)
Lack of Staff Support for Operations Department	1985 SALP, 86-06	1987 SALP, 88-21
Worker Overtime Control	1985 SALP, 85-26, 85-25, 86-37	1986 SALP, 1987 SALP, 87-06, 88-21, 88-27
Unreadable Station Drawings	86-37	88-27

2. RADIOLOGICAL CONTROLS

A. Programmatic Concerns	Reference	
Continuing Weakness in Followup to Problems	86-07, 86-21, 86-29	1987 SALP, 87-19 87-43, 88-21
Worker Attitude Towards Radiation Protection and Accountability	86-06	87-43
Implementation and QC of New Environmental TLD Program	86-09	87-29, 87-35, 1987 SALP
Communication between the Health Physics Group and Other Licensee Departments	86-06 86-19	1987 SALP, 87-43, 88-21

3. MAINTENANCE AND MODIFICATIONS

A. Programmatic Concerns	Source Reference	Closeout Reference
Maintenance Supervisory Staffing Vacancies	86-06	1987 SALP, 88-17, 88-21
Limited Maintenance - Operations Interface	86-29	1987 SALP, 88-17, 88-21
Implementation of Maintenance Planning Group (Backlog Disposition)	1985 SALP, 86-27	1987 SALP 88-17, 88-21
Formalization and Implementation of Preventative Maintenance Program	1985 SALP, 85-28, 85-30	1987 SALP, 88-21
B. Hardware		
ATWS Recirculation MG Set Field Breaker Failures	83-09, 85-03, 85-14, 86-21, 86-24	87-37
Breaker Setting and Coordination Implications of the Loss of Safety Bus B-10	86-14	87-37
Minimum Flow Protection for Residual Heat Removal Pumps	86-14, 86-25	88-25
Cracked Welds and Loose Bolts in Low Pressure ECCS Systems	85-28, 86-29, 86-34	88-03
Core Spray Check Valve and MOV Problems	86-29, 86-29, 86-34	88-03
Heat Damage to Primary Containment Isolation System Cabling	86-29	87-37
Secondary Containment Damper Failures	85-21, 86-25	87-37

	Source Reference	Closeout Reference
Salt Service Water Piping Corrosion	86-34	88-19
Potential Corrosion of Primary Containment Isolation Valves	86-25	88-03
Design Deficiency in Intermediate Range Neutron Monitor Power Supply	86-25	87-37
Residual Heat Removal and Core Spray Pump Inspection Results	86-21, 86-25, 86-34	87-42
Design Deficiency in the Standby Gas Treatment System	86-21, 86-37	87-37
Potential Concrete Wall Issue	86-31	87-37
Design Deficiency in the High Pressure Coolant Injection Turbine Exhaust System	85-18, 85-30	88-13
Loose Wiring	86-14	87-18, 87-46
Use of Fuses and Metal Links in Control Circuits	86-01, 86-21, 86-25	87-55
Seismic Qualification of HGA Relays	86-37	87-21

4. SURVEILLANCE

A. Programmatic Concerns	Reference	
Surveillance Scheduling Weaknesses	85-03, 86-21, 86-34	87-55, 88-21
ECCS Test Adequacy	86-21,	88-14
Calibration and Testing of Protective Relays and Breakers	86-25, 86-29	87-46
Control of Measuring and Test Equipment	86-14	87-12
Local Leak Rate Test Program Administration	None	87-02, 87-47, 88-21
B. Hardware Issues		
Recurring Local Leak Rate Test Failures	86-21 86-25	87-55

	Source Reference	Closeout Reference
5. EMERGENCY PREPAREDNESS		
A. Programmatic Concerns		
Emergency Action Level Review	86-33	87-37, 1987 SALP
6. SECURITY AND SAFEGUARDS		
A. Programmatic Concerns	Reference	
Continuing Weaknesses in Following Up on Problems	85-32, 86-34, 86-37	1987 SALP, 88-16, 88-21
Prioritization of Security Maintenance	86-08, 86-28 86-42	1987 SALP, 88-16, 88-21
Termination of the Use of Long Term Compensatory Measures	86-08, 86-28 86-42	1987 SALP, 88-16, 88-21
7. FIRE PROTECTION		
A. Programmatic Concerns	Reference	
Inadequate Fire Brigade Drills and Training	86-21, 86-25, 86-36, 86-37, 86-38	87-22
Inadequate use of Corrective Action Program	86-25, 86-36	87-26
Prioritization of Fire Protection Maintenance	86-06, 86-36, 86-14, 86-38	87-26
B. Hardware Issues		
Identification of Fire Barriers and Resolution of Penetration Discrepancies	83-06, 86-21, 86-34, 86-34	88-19
8. QUALITY ASSURANCE		
A. Programmatic Concerns	Reference	
Weakness in Responding to QA Findings	1985 SALP, 86-14	1987 SALP, 88-02, 88-21

9. REFUELING AND OUTAGE MANAGEMENT	Source Reference	Closeout Reference
A. Programmatic Concerns		
Housekeeping Control	1985 SALP	1987 SALP, 88-02, 88-21
B. Hardware Issues		
Resolution of Inservice Inspection NDE Indications on Safety Related Piping and Loose Piping Supports	86-34	87-37

10. LICENSING		
A. Programmatic Concerns	Reference	
Technical Specification Changes to Support Plant Startup	1985 SALP, 86-25, 86-29	1987 SALP

ATTACHMENT 2 TO APPENDIX C

U. S. NUCLEAR REGULATORY COMMISSION

REGION I

Meeting No.: 50-293/86-41

Docket No.: 50-293

License No.: DPR-35

Licensee: Boston Edison Company M/C Nuclear
800 Boylston Street
Boston, Massachusetts

Facility Name: Pilgrim Nuclear Power Station

Meeting Location: Boston Edison's Chiltonville Training Facility

Meeting Conducted: November 24, 1986

Prepared By: J. Lyash, Resident Inspector

Reviewed By: M. McBride, Senior Resident Inspector

Approved By: J. R. Wiggins
J. Wiggins, Chief, Projects Section 1B, DRP

12/19/86
Date

Meeting Summary: A management meeting was held at Boston Edison Company's Chiltonville Training Facility on November 24, 1986 to discuss plant status, the status of licensee management system improvements, SALP improvement status, Mark I Containment enhancement and a number of other issues. The meeting lasted about five hours. Members of the state legislature, Massachusetts Department of Public Utilities, Massachusetts Department of Public Health, Massachusetts Civil Defense Agency, INPO, Town of Plymouth Advisory Committee on Nuclear Matters, and the press attended the meeting.

DETAILS

1.0 Purpose

The management conference was held at the request of NRC Region I. The licensee was asked to discuss program improvements and other topics of interest at the plant.

2.0 Meeting Summary

The meeting was opened with brief comments by NRC Region I Administrator, Dr. T. Murley, and Boston Edison President and Chief Executive Officer, Mr. S. J. Sweeney. Boston Edison Chief Operating Officer, J. M. Lydon, began the presentations with an overview of the newly implemented work activities management system. Subsequent presentations addressed the status of overall backlog item resolution and individual section plans and progress. NRC regional management requested that reports documenting the progress of backlog reduction and the percentage resolved be provided for review by the resident inspectors. Proper prioritization of outstanding items to ensure completion prior to plant restart was stressed.

The Operations Department Section Head discussed ongoing efforts and plans to address the licensed operator staffing shortage. The low number of licensed reactor operators continues to be a problem.

The licensee's Radiological Section Head summarized Boston Edison's perspectives on the progress of the Radiological Improvement Program (RIP) and results of a recent NRC inspection of the RIP. Dr. Murley stressed that the NRC is not yet satisfied with the program. The implementation of the program and its effectiveness in assuring the safety of day-to-day activities is critical. The NRC will evaluate this implementation during future inspections.

Additional presentations reviewed: 1) the status of organizational changes and staffing, 2) primary containment enhancements, 3) fire protection program status and 4) emergency planning. Visual aids utilized during the presentations are enclosed for information.

3.0 Concluding Statements

Dr. Murley closed the meeting by indicating that program improvement efforts appear to be having a positive impact. Licensee progress in addressing both backlog and current issues prior to plant restart will continue to receive close NRC attention. Further, Dr. Murley indicated that the containment enhancements planned by Boston Edison during the current outage are commendable and a sign of licensee management's positive approach to this issue. Dr. Murley requested that the next management meeting be scheduled in late January, 1987.

MEETING ATTENDEES

50-293/86-41

U. S. Nuclear Regulatory Commission

T. Murley	Regional Administrator
W. Kane	Director Division of Reactor Projects
R. Bernero	Director, BWR Licensing, Office of Nuclear Reactor Regulation (NRR)
S. Ebneter	Director, Divison of Reactor Safety
R. Bellamy	Chief, Emergency Preparedness and Radiation Protection Branch
J. Strosnider	Chief, Materials & Processes Section
J. Wiggins	Chief, Reactor Projects Section 1B
M. McBride	Senior Resident Inspector, Pilgrim
J. Lyash	Resident Inspector, Pilgrim
R. Auluck	Project Manager, NRR

Boston Edison Company (BECo)

S. Sweeney	President and CEO
J. Lydon	Chief Operating Officer
J. Tyrbell	Executive Vice President
E. Howard	Vice President - Engineering & QA
A. Oxsen	Vice President - Nuclear Operations
C. Gustin	Vice President - Corporate Relations
A. Pederson	Plant Manager
K. Roberts	Director of Outage Management
R. Swanson	Nuclear Engineering Manager
S. Hudson	Operations Section Head
N. Brosee	Maintenance Section Manager
J. Seery	Technical Section Manager
T. Sowdon	Radiological Section Manager
E. Ziemianski	Nuclear Management Services Section Manager
R. Grazio	Field Engineering Section Manager
J. Ashkar	Assistant to the President
J. Fulton	Staff-Vice President Nuclear Operations
W. Frigard	Senior Counsel
W. Stowe	Legal Department
D. Horan	Legal Department
R. Silva	Emergency Preparedness Coordinator
L. McDonald	Planning and Scheduling
R. Tis	Public Information
M. Monahan	Public Information
P. Hamilton	Compliance
D. Tepper	Human Resource Consultant

Other Attendees

C. Barnett	Massachusetts Department of Public Utilities
P. Garrity	Massachusetts Department of Public Utilities
P. Forman	State Representative - Plymouth/Kingston
P. Agnes Jr.	Assist. Secretary of Mass. Department of Public Safety
T. Matthews	Mass. Department of Public Health
G. Swible	Mass. Department of Public Health
R. Boulay	Director, Mass. Civil Defense Agency
J. Ryan	Plymouth Advisory Committee on Nuclear Matters
C. Adey	Plymouth Advisory Committee on Nuclear Matters
T. Bosen	Plymouth Advisory Committee on Nuclear Matters
B. Conway	INPO - Vice President

Press

F. Creane	The Enterprise
J. Crockford	Patriot Ledger
J. Bernstein	Old Colony Memorial

APPENDIX D

APPENDIX D

Correspondence Concerning Staff Review and Acceptance of the Boston Edison Company (BECo) Restart Plan

Letter	Subject
NRC to BECo dated March 18, 1988	Request for Additional Information (RAI)
BECo to NRC dated April 14, 1988	BECo Response to March 18, 1988 NRC RAI
BECo to NRC dated May 6, 1988	BECo Supplemental Response to NRC RAI
NRC to BECo dated May 6, 1988	NRC Acceptance of BECo Restart Plan

ATTACHMENT 5

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
475 ALLENDALE ROAD
KING OF PRUSSIA, PENNSYLVANIA 19406

MAY 06 1988

Docket No. 50-293

Boston Edison Company
ATTN: Mr. Ralph G. Bird
Senior Vice President - Nuclear
800 Boylston Street
Boston, Massachusetts 02199

Gentlemen:

This letter refers to the NRC staff review of the Pilgrim Nuclear Power Station Restart Plan, as submitted by Boston Edison Company (BECo) in letters dated July 30, 1987, October 27, 1987 and December 30, 1987. The NRC staff has completed its review of the plan, as well as your April 14 and May 6, 1988 responses to the NRC's March 18, 1988 request for additional information. Comments received from the public and from elected officials were considered during the staff review.

The NRC staff has concluded that the Plan, as clarified by your April 14 and May 6, 1988 letters, provides a suitable framework for responding to the NRC's request for a self evaluation of restart readiness as described in our August 27, 1986 update of Confirmatory Action Letter (CAL) 86-10.

Having now acknowledged the viability of the Plan as clarified by your two supplementary letters, the NRC staff will form a conclusion on the effectiveness of its implementation at a later date. The NRC staff's process in this regard will involve, in part, review of Boston Edison Company's anticipated "Final Report of Management Self-Assessment of Readiness to Restart," review of the anticipated final update of the Restart Plan including implementation, and evaluation of results of various ongoing and planned NRC inspection and review activities.

Please note that, in another matter related to CAL 86-10, NRC staff review of your proposed Power Ascension Program is ongoing.

Your cooperation in these matters is appreciated.

Sincerely,

Samuel J. Collins

Samuel J. Collins, Deputy Director
Division of Reactor Projects

MAY 06 1988

cc:
K. Highfill, Station Director
R. Anderson, Nuclear Operations Manager
B. McIntyre, Chairman, Department of Public Utilities
J. Keyes, Boston Edison Regulatory Affairs and Programs
E. Robinson, Nuclear Information Manager
R. Swanson, Nuclear Engineering Department Manager
The Honorable Edward J. Markey
The Honorable Edward P. Kirby
The Honorable Peter V. Forman
P. Agnes, Assistant Secretary of Public Safety, Commonwealth of Massachusetts
Chairman, Plymouth Board of Selectmen
Chairman, Duxbury Board of Selectmen
Plymouth Civil Defense Director
S. Pollard, Secretary of Energy Resources
R. Shimshak, MASSPIRG
Public Document Room (PDR)
Local Public Document Room (LPDR)
Nuclear Safety Information Center (NSIC)
NRC Resident Inspector
Commonwealth of Massachusetts (2)

BOSTON EDISON
Pilgrim Nuclear Power Station
Rocky Hill Road
Plymouth, Massachusetts 02360

Ralph G. Bird
Senior Vice President — Nuclear

May 6, 1988
BECo Letter # 88-076

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555

Docket No. 50-293
License No. DPR-35

Dear Sir:

This letter provides additional information regarding the Pilgrim Nuclear Power Station Restart Plan requested by Mr. R. Blough during a telephone conversation with Mr. R. Ledgett on May 4, 1988.

The current status of the "Performance Excellence Indicators" is provided as Attachment 1. The "Final Report of Management Self-Assessment of Readiness to Restart", scheduled for submittal by May 16, 1988, will also include a current status of the "Performance Excellence Indicators".

The current organization chart is provided as Attachment 2.

A discussion of the changes since the Restart Plan was issued, including how the functions of the Planning and Restart Organization responsibilities are accomplished in the current organization will be provided in the "Final Report of Management Self-Assessment of Readiness to Restart".

Please contact me directly if there are any questions regarding this letter.

R.G. Bird

CS/bl

Attachments

cc: Mr. William Russell
Regional Administrator, Region I
U.S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406

Sr. Resident Inspector - Pilgrim Station

Attachment 1

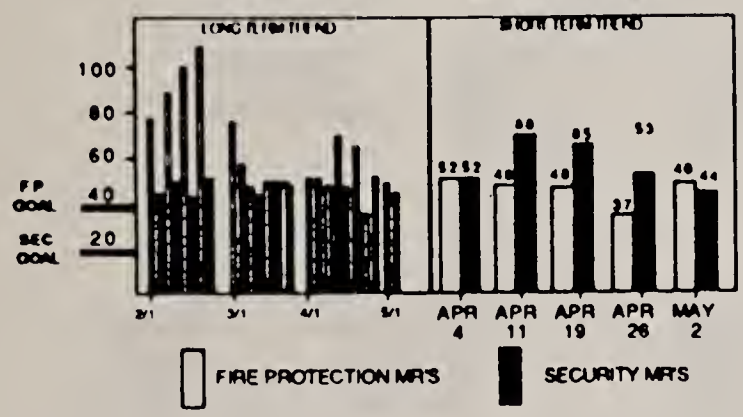
PILGRIM NUCLEAR POWER STATION

5/3/88

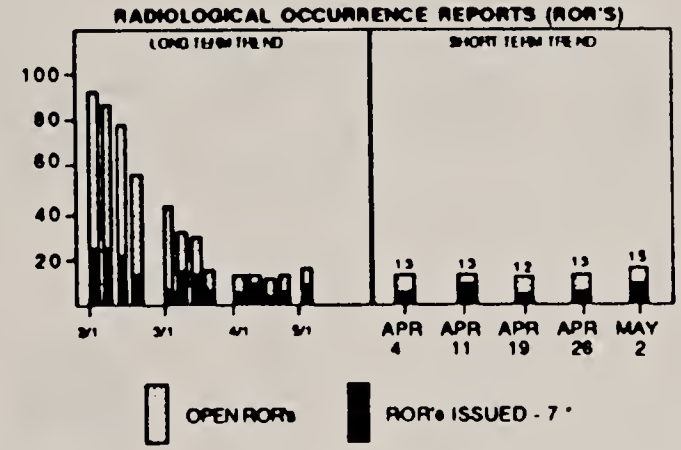
PERFORMANCE EXCELLENCE INDICATORS

(STATUS AS OF MAY 2, 1988)

OPEN FIRE PROTECTION & SECURITY MR'S

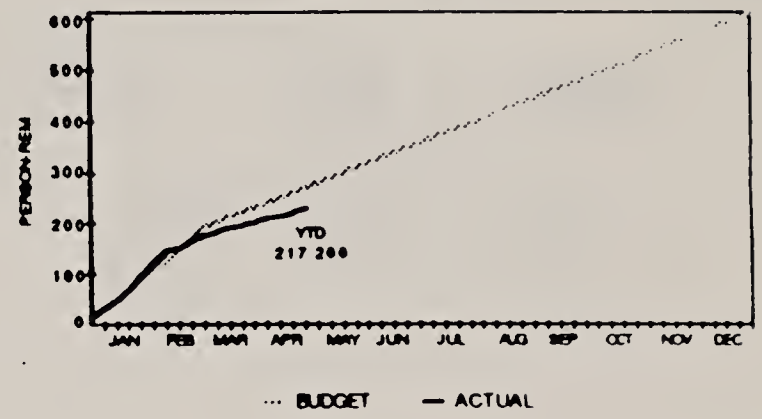


RADIOLOGICAL OCCURRENCE REPORTS (ROR'S)

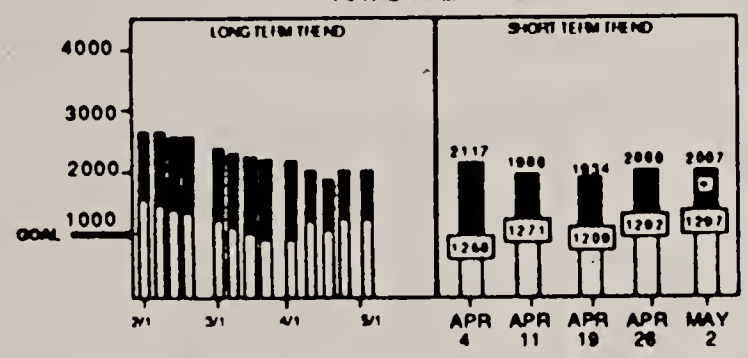


* 5/2 - 2 MAJOR ROR's

ALARA TRACKING

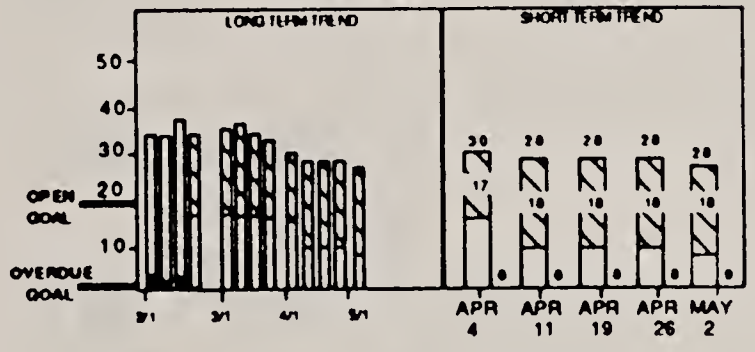


TOTAL OPEN MR'S



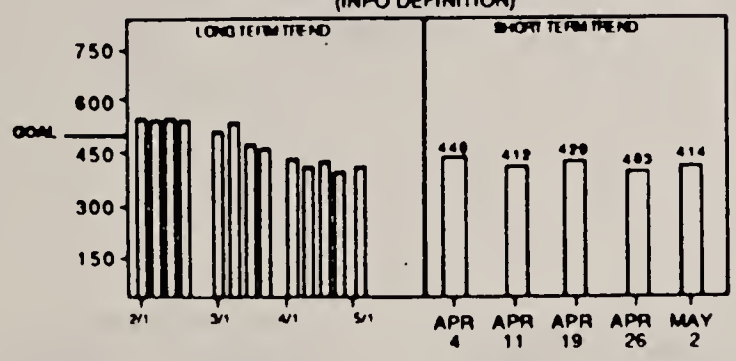
* 5/2 - 710 IN TEST - T/O OF WHICH 686 ARE NOT REQUIRED FOR S/U.

OPEN DEFICIENCY REPORTS (DR'S)



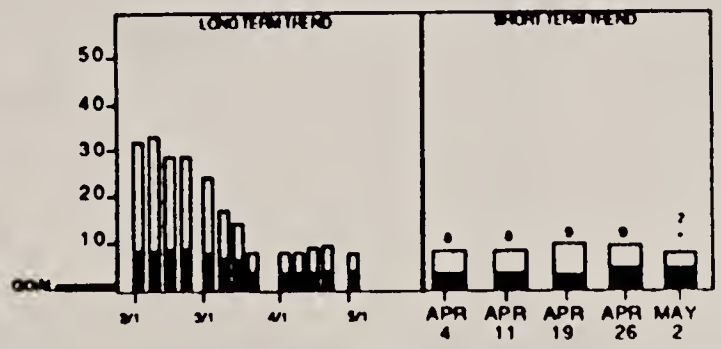
PLANT DECONTAMINATION

OPEN POWER BLOCK RELATED MR'S
(INPO DEFINITION)



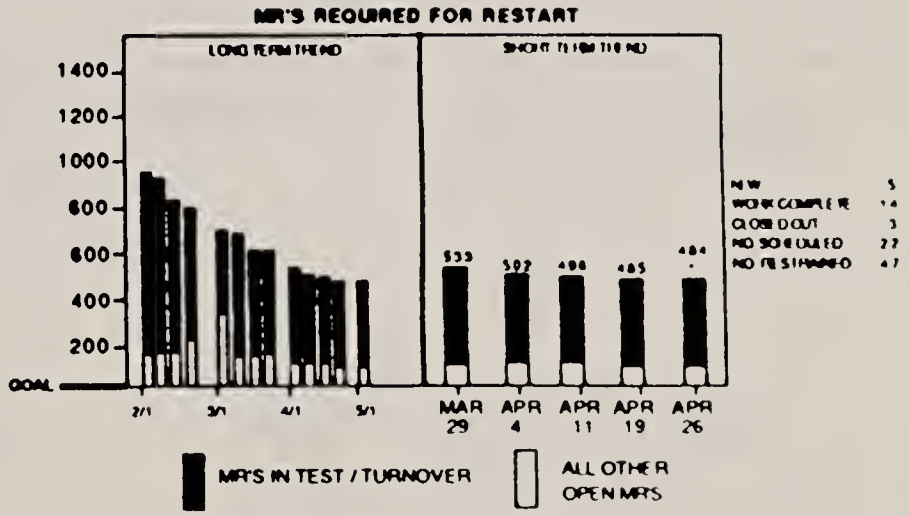
* DOES NOT INCLUDE MR's IN TESTING AND CLOSE OUT

NON-CONFORMANCE REPORTS (NCR'S)



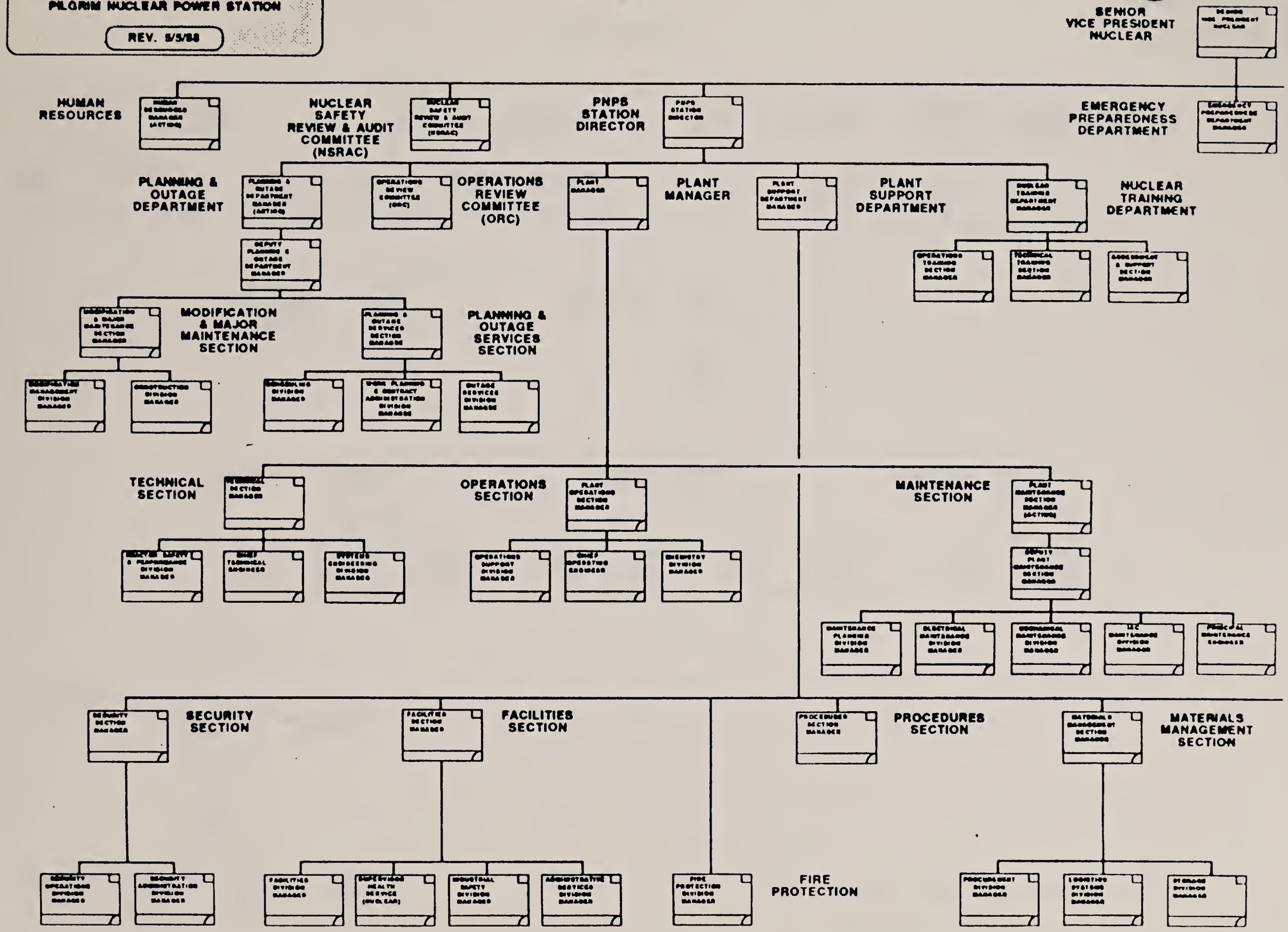
* 5/2 - 4 POWER BLOCK NCR's

MR'S REQUIRED FOR RESTART

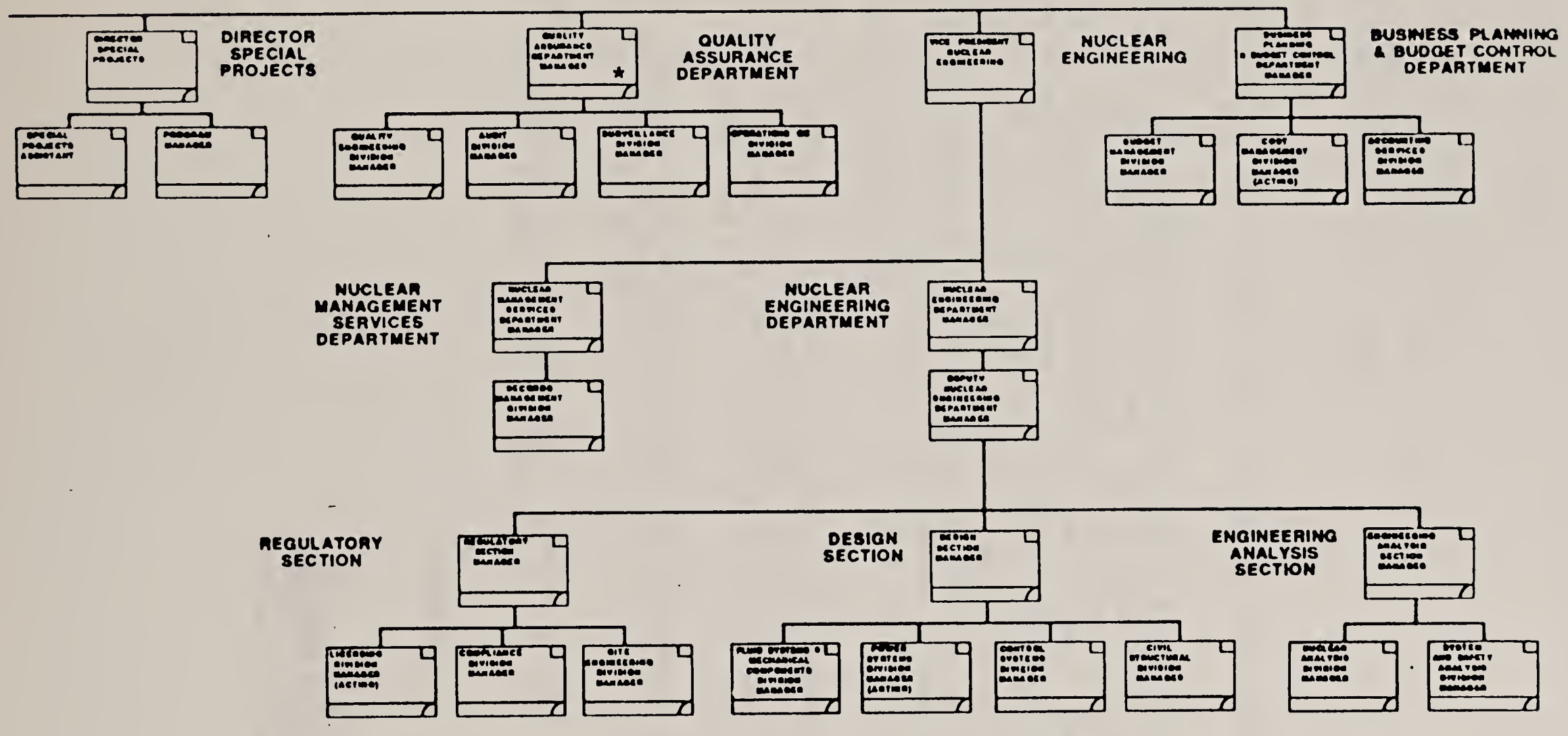


* 5/2 - 97 PHYSICAL WORK TO BE COMPLETED

BOSTON EDISON COMPANY
PILGRIM NUCLEAR POWER STATION
REV. 5/5/88



Attachment 2



* In transition from V.P. Engineering to Senior V.P. Nuclear

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
475 ALLENDALE ROAD
KING OF PRUSSIA, PENNSYLVANIA 19406

MAR 18 1982

Docket No. 50-293

Boston Edison Company
ATTN: Mr. Ralph G. Bird
Senior Vice President - Nuclear
800 Boylston Street
Boston, Massachusetts 02199

Gentlemen:

This refers to the NRC staff review of the Pilgrim Nuclear Power Station Restart Plan.

Overall, we found the Restart Plan to be basically sound and determined that the programs and plans described within appear to address the previously identified management and hardware deficiencies. Nonetheless, several concerns and questions were identified during our review. These concerns and questions are identified in Enclosure 1 and were discussed with Mr. R. Ledgett and other members of your staff by Mr. L. Doerflein onsite on February 19, 1988, and by Messrs. A. R. Blough and L. Doerflein during a subsequent telephone conversation on February 22, 1988. You are requested to respond to these concerns and questions indicating your existing programs, procedures, and/or planned actions to resolve each item. Please provide a written response within 30 days of receipt of this letter.

The staff is also reviewing oral and written comments received from the public as a result of our February 18, 1988 public meeting and associated request for written comments. As our review progresses, further information or actions may be requested from you.

The response directed by this letter is not subject to the clearance procedures of the Office of Management and Budget as required by the Paperwork Reduction Act of 1980, PL 96-511.

Should you have any questions concerning this letter, please contact Mr. A. Randy Blough at 215-337-5146.

Sincerely,

Samuel J. Collins, Deputy Director
Division of Reactor Projects

Enclosure:
As stated

cc w/encl:
R. Barrett, Nuclear Operations Manager
B. McIntyre, Chairman, Department of Public Utilities
Chairman, Plymouth Board of Selectmen
Plymouth Civil Defense Director
J. Keyes, Boston Edison Regulatory Affairs and Programs
E. Robinson, Nuclear Information Manager
R. Swanson, Nuclear Engineering Department Manager
The Honorable Edward J. Markey
The Honorable Edward P. Kirby
The Honorable Peter V. Forman
S. Pollard, Secretary of Energy Resources
P. Agnes, Assistant Secretary of Public Safety, Commonwealth of Massachusetts
R. Shimshak, MASSPIRG
Public Document Room (PDR)
Local Public Document Room (LPDR)
Nuclear Safety Information Center (NSIC)
NRC Resident Inspector
Commonwealth of Massachusetts (2)

ENCLOSURE 1

NRC Concerns and Questions on the Pilgrim Restart Plan

1. Volume 1, Chapter 2 of the Restart Plan needs to be updated to reflect the recent organizational and personnel changes.

2. Under the new organization, how will the functions attributed to the Planing and Restart Group as defined in Volume 1, Chapters 2 and 3 be accomplished? For example, the Work Planning and Estimating Branch provided each section with a full time planner designed to enable the section to improve planning and scheduling of its own work and coordinate and integrate its work plans and schedules with those of other sections and disciplines.

3. There are no action items in the appendices to schedule, indicate status, or track the program discussed in Volume 1, Chapter 4, of transferring fire protection surveillance currently performed by plant operators to the Fire Protection Group.

4. There is no discussion in the Restart Plan on the adequacy or effectiveness of High Radiation Area control.

5. There are no action items assigned or discussion of trending performance and/or measuring effectiveness of the completed action items in Appendix 10, Issue 02-009, "Improve the radiological performance of Pilgrim Station personnel."

6. How do the work stoppage during the week of November 9, 1987; the Loss of Offsite Power Augmented Inspection Team findings; and, the recent numerous Engineered Safeguards Feature actuations relate to the Material Condition Improvement Action Plan (MCIAP) as discussed in Volume 1, Chapter 4? Has BECo evaluated whether any changes to the MCIAP or other programs are necessary because of these events?

7. Appendix 10, Issue 03-940-01 on the evaluation of procedures for receiving vendor supplied information and providing recommendations to correct identified problem areas has a due date of restart plus 240 days. This milestone appears excessive for the indicated action. What is the status of improving control of vendor supplied information?

8. Appendix 10, Issue 03-905-08 discusses an evaluation of the motor operated valve failure analysis reports for adequacy. What followup actions and schedule will be developed from this evaluation?

9. Why is the schedule for Maintenance Group performance trending system, Appendix 10, Issue 03-906-02, tied to restart? What is the current status of this system?

10. While a few specific procedure updates appear as action items and the legibility of drawings is discussed in Appendix 10, Issue 06-003, how will BECo ensure all procedures and drawings have been reviewed for adequacy and updated (if necessary) prior to restart?

11. There is no action item or discussion in Volume 1 or Volume 2, Appendix 10, Issue 07-001, of scheduling and tracking the technical training of BECo security personnel. This appears necessary to ensure the new hires can be fully utilized and, in the interim, assigned duties and responsibilities commensurate with their training and qualifications.

12. With respect to Appendix 10, Issue 07-002-11, what is the new completion schedule for the access control modifications?

13. There is no action item or discussion in Volume 1 or Volume 2, Appendix 10, Issue 10-002, of a training plan for management and technical new hires.

14. The NRC disagrees with the change made in Appendix 11, Page 19, and has concluded lesson plans are necessary for the EAL training. (Based on our February 22 teleconference, we believe BECo concurs with our position).

15. Appendix 2, "Level I RFO-7 Schedule" and Appendix 5, "Performance Excellence Indicators" need to be periodically updated and distributed to interested parties.

ATTACHMENT 4

BOSTON EDISON
Pilgrim Nuclear Power Station
Rocky Hill Road
Plymouth, Massachusetts 02360

Ralph G. Bird
Senior Vice President — Nuclear

April 14, 1988
BECo Ltr. #88-079

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555

Docket No. 50-293
License No. DPR-35

Dear Sir:

This letter is submitted in response to the NRC Staff questions transmitted by NRC letter dated March 18, 1988 regarding the Pilgrim Nuclear Power Station Restart Plan .

Attachment 1 contains a restatement of the NRC question followed immediately by the Boston Edison response. Please contact me directly if there are any questions regarding this letter.

R. G. Bird

PJH/bl

Attachment

cc: Mr. William Russell
Regional Administrator, Region 1
U.S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406

Sr. Resident Inspector - Pilgrim Station
Standard BECo distribution

ATTACHMENT 1

BECO Response to NRC Review of Pilgrim Restart Plan

NRC Question 1

Volume 1, Chapter 2 of the Restart Plan needs to be updated to reflect the recent organizational and personnel changes.

BECO Response

The recent organizational and personnel changes within the nuclear organization of Boston Edison Company will be described in a chapter on organizational and personnel changes in the Final Report of Management Self-Assessment of Readiness to Restart. This report, which documents the results of the self-assessment, is a companion document to the Restart Plan and the Power Ascension Program. According to the current schedule, the self-assessment report will be issued in mid-May, 1988.

NRC Question 2

Under the new organization, how will the functions attributed to the Planning and Restart Group as defined in Volume 1, Chapters 2 and 3 be accomplished? For example, the Work Planning and Estimating Branch provided each section with a full time planner designed to enable the section to improve planning and scheduling of its own work and coordinate and integrate its work plans and schedules with those of other sections and disciplines.

BECO Response

Although the new Organization no longer has a group entitled "Planning and Restart Group", the functions attributed to that group have been retained, primarily in the Planning and Outage Management Department.

For example, there remains a full time planner(s) from the Planning and Outage Management Department assigned to each Department to enable each Department to improve planning and scheduling of its own work and coordinate and integrate its work plans and schedules with those of other sections and disciplines. The Materials Management Section was re-organized under the Plant Support Department.

In addition, each day at 0800 hrs. and 1500 hrs. coordination meetings are held to facilitate support services (e.g.: Health Physics, Building services) for the day and to integrate the work which has been planned.

NRC Question 3

There are no action items in the appendices to schedule, indicate status, or track the program discussed in Volume 1, Chapter 4, of transferring fire protection surveillance currently performed by plant operators to the Fire Protection Group.

BECO Response

The transition of responsibility for the performance of fire protection surveillances from the plant operators to the Fire Protection Group is scheduled after plant start-up outside the context of the Restart Plan. The plan which currently indicates the schedule and status and tracks this program is the Nuclear Fire Protection Group Long Term Plan. This issue is tracked as item number seven in this plan.

The purpose in scheduling the transition after plant start-up is to ensure an orderly turn-over, undisturbed by start-up pressures.

In addition, fire protection personnel have focused existing resources on commitments which have been scheduled to be accomplished prior to plant restart.

The current schedule for transferring the responsibility for performing fire protection surveillances to the Fire Protection Group is December, 1988.

NRC Question 4

There is no discussion in the Restart Plan on the adequacy or effectiveness of High Radiation Area control.

BECO Response

Effectiveness in the control of High Radiation Areas was identified as an area of concern by review of Radiological Occurrence Report (ROR) trends as described in the Radiological Action Plan (Action 02-603-02). Action was taken to restrict the handling of Locked High Radiation Area keys to Radiation Protection personnel for all work activities except non-routine plant operations. A process of continuous access point monitoring and double verification of door closure upon final exit has been initiated.

A directive from the Station Director to all site personnel has reemphasized the importance of individual responsibility and outlined the disciplinary policy for future violations.

Since implementation of these controls, the number of ROR's related to control of High Radiation Areas for the subsequent three months dropped by 90% compared to the previous three month period.

Effectiveness of control has been achieved. Close attention to this trend indicator will continue as described in the Radiological Action Plan.

NRC Question 5

There are no action items assigned or discussion of trending performance and/or measuring effectiveness of the completed action items in Appendix 10, Issue 02-009, "Improve the radiological performance of Pilgrim Station personnel."

BECO Response

Improvement of the radiological performance of Pilgrim Station personnel is addressed in a continuing fashion by and comprehensively addressed within the Radiological Action Plan (RAP). This plan was prepared as a result of self-assessments at the completion of the prior Radiological Improvement Program effort. The status of RAP actions are contained in Tab 7 to the Restart Plan, Volume 2, Rev. 1.

NRC Question 6

How do the work stoppage during the week of November 9, 1987; the Loss of Offsite Power Augmented Inspection Team findings; and, the recent numerous Engineered Safeguards Feature actuations relate to the Material Condition Improvement Action Plan (MCIAP) as discussed in Volume 1, Chapter 4? Has BECo evaluated whether any changes to the MCIAP or other programs are necessary because of these events?

BECO Response

The first portion of this question pertains to how recent events relate to the Material Condition Improvement Action Plan.

As part of the investigations of the events leading to the work stoppage of November 9, 1987 and of the Loss of Offsite Power (LOOP) BECo determined that common threads existed. The common threads involved: (1) planning, and (2) supervision of the activities of station personnel. Many of the investigations following specific Engineered Safety Features (ESF) actuations have resulted in the identification of these same common threads.

Many of these recent events relate to the programmatic improvements of the long term MCIAP actions. The actions related to improvement of the planning and supervision of activities are in progress and are scheduled to complete over the next several months.

The existing MCIAP issues and long term actions that will assist management in preventing or minimizing the occurrence of similar events are:

- The long term organizational and staffing improvements outlined in the actions of issue 03-001.
- The performance standards improvements of issue 03-005.
- The supervisory development policy of issue 03-011.

- The management feedback and MR scheduling improvements identified in issue 03-012 and improvements to the MR process outlined in issue 03-013.

- The maintenance planning improvements of issues 03-016 and 019.

- The work assignment improvements of 03-020.

- Development of an automated maintenance data base in accordance with issue 03-027.

- Preventive maintenance improvements of 03-028.

The second portion of question number 6 pertains to whether Boston Edison has evaluated the need to change the MCIAP or other programs because of these events.

BECo has evaluated whether changes to the MCIAP or other programs are necessary. The results of those evaluations are summarized as follows:

a) A Work Stoppage "action plan" was developed using a data base file similar to the MCIAP and actions are in progress or complete.

b) The results of the BECo LOOP investigation and the AIT findings were incorporated into the Restart Plan Appendix 10 listing and the required actions are in progress or complete.

c) To date no required changes to the MCIAP in the above discussed areas have been identified, but reports of critiques and other problem identification processes are reviewed to identify possible programmatic items requiring MCIAP issue or action development.

NRC Question 7

Appendix 10, Issue 03-940-01 on the evaluation of procedures for receiving vendor supplied information and providing recommendations to correct identified problem areas has a due date of restart plus 240 days. This milestone appears excessive for the indicated action. What is the status of improving control of vendor supplied information?

BECO Response

The Appendix 10 Action Item 03-940-01 encompasses all vendor technical information. BECo has a vendor technical information control program which is implemented by several groups and has been inspected by the NRC and audited by our QA Department with favorable results. The elements of the vendor technical information program include the Operating Experience Review Program, which provides centralized control for vendor technical information generated by INPO and our NSSS supplier (General Electric Company), the Regulatory Affairs and Programs Division's control of information generated by the NRC regarding plant equipment supplied by vendors, and vendor information from other sources which line organizations evaluate via existing processes.

The industry has endeavored for several years to develop recommendations for integrated vendor technical information control. The approach we plan to use will capitalize on the industry's progress. We intend to consider key elements of the NUTAC (Nuclear Utility Task Action Committee) Vendor Equipment Technical Information Program (VETIP) INPO 84-010 dated March 1984. The result will be a centralized approach to implement a VETIP at BECo.

The schedule for Appendix 10 Action Item 03-940-01 was developed considering the fact that the programs/processes listed above provided adequate interim assurance that vendor information has been sufficiently implemented to support plant operation.

Accordingly, our schedule of restart plus 240 days was based on the magnitude of the effort to fully implement an integrated VETIP, recognizing the competing priorities to support plant restart and considering the need to accomplish this effort with our own personnel.

NRC Question 8

Appendix 10, Issue 03-905-08 discusses an evaluation of the motor operated valve failure analysis reports for adequacy. What followup actions and schedule will be developed from this evaluation?

BECO Response

The effectiveness evaluation of the MOV Program commenced in March 1988 upon the completion of the associated outage work activities. This review is scheduled to conclude June 17, 1988. The recommendations and improvement findings will be incorporated into the MOV Preventive Maintenance Program for RFO-8. Should significant follow-up actions result from the effectiveness evaluation, a modified response to this question will be provided including both the recommended follow-up actions and schedule for implementation.

NRC Question 9

Why is the schedule for Maintenance Group performance trending system, Appendix 10, Issue 03-906-02, tied to restart? What is the current status of this system?

BECO Response

This item should have been categorized as a CONTINUING item as defined in Appendix 10. The Maintenance Group Performance Trending System has been implemented as a management tool to focus awareness on the performance indicators, and is published on a weekly basis. Action item 03-906-02 was closed on 02/08/88, after repeated monthly evaluations of continued effectiveness.

NRC Question 10

While a few specific procedure updates appear as action items and the legibility of drawings is discussed in Appendix 10, Issue 06-003, how will BECo ensure all procedures and drawings have been reviewed for adequacy and updated (if necessary) prior to restart?

BECO Response

This question has two major elements. The first element relates to procedural adequacy and the second element relates to drawing adequacy. The BECo Response addresses each element separately.

Procedure Adequacy

The processes in place at the PNPS to ensure procedure adequacy for plant restart are (1) the procedure validation process, (2) the two year review process required by ANSI N18.7-1976 and (3) the recent administrative requirement that drawing changes be appropriately tied to the procedure change process. Procedures are also reviewed for adequacy prior to implementation.

Drawing Adequacy

Drawing adequacy for the safe operation of PNPS is ensured by, (1) Engineering procedures requiring design drawings to be updated to reflect design changes, (2) the records management system identifying for retrieval the current official revision of all drawings, and any outstanding design change modifications not yet incorporated, and (3) walkdowns of plant systems which have been performed to ensure drawings used on a daily basis by plant operations personnel are current and adequate.

Design Change Drawing Update

NED procedures require that drawing changes be issued through the Plant Design Change (PDC) process. After modification implementation, these drawings are updated to reflect the as-built design change and issued as an official "E" revision. Additionally, the PDC lists drawings affected by the change (but not needed for modification implementation) so that these may also be updated and re-issued.

The PDC drawing update effort is prioritized so that drawings which may be used on a daily basis by plant operations personnel are updated first. These so-called "Priority" drawings must be issued as an official "E" revision prior to operational turnover of the system. Non-priority drawings are updated to reflect as-built design changes after system turnover.

System Walkdowns for Drawing Validation

At the time these drawing update requirements were formally introduced (1984), it was recognized that previous design changes may not have been fully incorporated on official "E" revisions of drawings. The effort to confirm drawing adequacy included walkdowns of certain Priority drawings used most frequently by operations and maintenance personnel (e.g. P&ID's). The walkdowns resulted in the identification and correction of drawing discrepancies on these drawings.

In addition, a specific procedure was developed to provide for a systematic review of all design changes from initial plant startup through refueling outage #6. Approximately 13,000 drawings have been revised under this program.

Records Management

A system user has access to a complete picture of the current design status of any plant structure, system, or component by use of the Document Control Centers managed by the Records Management Division.

Summary

In summary, Boston Edison has undertaken a comprehensive series of measures (e.g., design change drawing update, records management and the corrective action program) which provide continuous controls to ensure drawing adequacy.

NRC Question 11

There is no action item or discussion in Volume 1 or Volume 2, Appendix 10, Issue 07-001 of scheduling and tracking the technical training of BECo security personnel. This appears necessary to ensure the new hires can be fully utilized and, in the interim, assigned duties and responsibilities commensurate with their training and qualifications.

BECO Response

The Nuclear Security Section has developed a training program for security management outside the context of the Restart Plan. The program was designed specifically for the Security Shift Supervisors. However, other BECo and contractor security supervisory personnel also attend the training. This training covers the following subjects:

- PNPS Security Plan
- Safeguards Contingency Plan
- Security Force Training and Qualification Plan
- Implementing Procedures (for the three plans)
- Safeguards Event Report (10 CFR 73.71)
- Protection of Safeguards Information (10 CFR 73.21)
- Duties and Responsibilities of the Contract Security Force
- Supervisory Training (commensurate with their Duty Positions)

The completion date for training all current Security Shift Supervisors is scheduled for April 29, 1988. The new Administrative, Compliance and Technical positions were filled with individuals who were already qualified and experienced in their respective positions. Additionally, the more recent hires to fill the Security Shift Supervisor positions all have a nuclear security background. Existing security supervisory personnel are qualified for the positions they fill.

NRC Question 12

With respect to Appendix 10, Issue 07-002-11, what is the new completion schedule for the access control modifications?

BECO Response

The planned access control modifications at the Main Access Point which include installation of x-ray equipment for package searches and full length turnstiles for added protection are scheduled for completion by September 30, 1988.

NRC Question 13

There is no action item or discussion in Volume 1 or Volume 2, Appendix 10, Issue 10-002, of a training plan for management and technical new hires.

BECO Response

Boston Edison is in the process of restructuring and expanding its supervisory and management training programs outside the context of the Restart plan.

The new structure includes four component programs:

- New Exempt Orientation
- New Supervisor Orientation
- Management-Supervision Initial
- Management-Supervision Continuing

New management employees are required to participate in New Exempt Orientation, normally within the first three months of their employment. The content of this program includes, but is not limited to the following topics:

Nuclear Organization
Administration
Records Management
Nuclear Regulatory Affairs
Quality Assurance & Corrective Action
Planning and Scheduling
Safety
Fire Protection Plan
Housekeeping Policy
Conduct of Operations
Radiological Protection/ALARA

This program is instructed by the subject matter experts and is designed to give the staff sufficient skill and knowledge to permit them to function efficiently. They are also given the name of a contact person in each area should they require assistance.

New supervisors will also participate in the New Supervisor Orientation program and Management-Supervision Initial training. The format of the New Supervisor Orientation program is the same as the New Exempt Orientation program.

Management-Supervision Initial is a formal program to teach basic supervisory skills.

Management-Supervision Continuing is offered to all managers and supervisors on an "as-needed" basis. Identification of the different programs is accomplished normally through the use of a needs assessment form which Nuclear Training circulates to coincide with the company's annual developmental reviews. The results of the assessment are analyzed and an annual plan established based upon the frequency of response and perceived need.

On the technical side, we have an INPO-accredited program entitled Technical Training for Staff and Managers. This program is coordinated by the Technical Training Section and is targeted for a wide variety of technical personnel. In addition to initial training, there is a program of continuing training that ranges in length from 8 to 20 hours per year.

NRC Question 14

The NRC disagrees with the change made in Appendix 11, Page 19, and has concluded lesson plans are necessary for the EAL training. (Based on our February 22 teleconference, we believe BECO concurs with our position).

BECO Response

Lesson plans for training on the new EAL's are currently being prepared. This training will be conducted during Session VIII currently scheduled for May 2, 1988 of the Licensed Operator Requalification Training (LORT) Program.

NRC Question 15

Appendix 2, "Level I RFO-7 Schedule" and Appendix 5, "Performance Excellence Indicators" need to be periodically updated and distributed to interested parties.

BECO Response

Various indicators, including the Performance Excellence Indicators, and others now useful to management are updated weekly. These various indicators are widely distributed and displayed on site bulletin boards. The status of these performance indicators will be included in the Final Report of Management Self-Assessment of Readiness to Restart which will be provided to the NRC and interested parties.

APPENDIX E

Correspondence and Staff's Report on the Review of Boston Edison Company's (BECo) Restart Readiness Self-Assessment

Letters	Subject
Memo L. Doerflein to S. Collins, dated August 5, 1988	Staff report on the review of BECo's Restart Readiness Self-Assessment (RRSA)
NRC to BECo, dated July 11, 1988	Acceptance of RRSA and Scheduling of IATI

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
475 ALLENDALE ROAD
KING OF PRUSSIA, PENNSYLVANIA 19406

11 JUL 1988

Docket No. 50-293

Boston Edison Company
ATTN: Mr. Ralph G. Bird
Senior Vice President - Nuclear
Pilgrim Nuclear Power Station
RFD #1 Rocky Hill Road
Plymouth, Massachusetts 02360

Gentlemen:

This refers to your letter #88-099, dated June 25, 1988, which provided the schedule for those matters identified in the Restart Readiness Self-Assessment (RRSA) requiring completion of specific actions for restart and requested commencement of the NRC Integrated Assessment Team Inspection (IATI).

We have reviewed the actions and schedule provided in your letter. Telephone conversations were held between Messrs. R. Blough and L. Doerflein of my staff and Mr. R. Ledgett and other members of your staff on June 29 and 30, 1988, to clarify some of the actions and dates provided. Our understanding of the issues discussed during the telephone conversations is provided in the attachment to this letter. If you do not agree with the clarification as stated, please notify us promptly.

Based on our June 20-24, 1988 onsite review of your self-assessment process and conclusions, and on our review of the actions and schedules provided in your June 25, 1988 letter, the NRC staff has concluded that the Boston Edison Company (BECo) has satisfied our request to provide for a self evaluation of restart readiness as described in our August 27, 1986 update of Confirmatory Action Letter No. 86-10. Based on our understanding of the status of your restart programs, the NRC will schedule the IATI to independently review and assess the readiness of your management controls, programs and personnel to support safe restart of the facility. Onsite preparation for the IATI will be conducted during July 19-21, 1988. The inspection is tentatively scheduled to begin August 8, 1988. If you have any questions concerning the IATI, please contact Mr. R. Blough of my staff at (215) 337-5146.

Your cooperation in this matter is appreciated.

Sincerely,

Samuel J. Collins, Deputy Director
Division of Reactor Projects

Attachment:
As stated

cc w/attachment:
K. Highfill, Station Director
R. Anderson, Plant Manager
J. Keyes, Licensing Division Manager
E. Robinson, Nuclear Information Manager
R. Swanson, Nuclear Engineering Department Manager
The Honorable Edward J. Markey
The Honorable Edward P. Kirby
The Honorable Peter V. Forman
B. McIntyre, Chairman, Department of Public Utilities
Chairman, Plymouth Board of Selectmen
Chairman, Duxbury Board of Selectmen
Plymouth Civil Defense Director
P. Agnes, Assistant Secretary of Public Safety, Commonwealth of Massachusetts
S. Pollard, Massachusetts Secretary of Energy Resources
R. Shimshak, MASSPIRG
Public Document Room (PDR)
Local Public Document Room (LPDR)
Nuclear Safety Information Center (NSIC)
NRC Resident Inspector
Commonwealth of Massachusetts (2)

ATTACHMENT

Clarifications of June 25, 1988 Letter Requesting Team Inspection

The following clarifications were provided by Messrs. Ledgett and Schmelling, Boston Edison Company (BECo), during telephone conversations with Messrs. Blough and Doerflein, on June 29 and 30, 1988. The below listed BECo clarifications apply to Attachment I of the June 25, 1988 BECo letter #88-099.

1. Regarding Actions B.1 and B.2 to upgrade maintenance controls (Page 5), BECo also has several mechanisms intended to promptly assess effectiveness. These mechanisms include evaluation by the Material Condition Improvement Action Plan (MCIAP) group, QA surveillances, and review by the Management Oversight and Assessment Team (MO&AT).

2. Regarding Action 5.a on Page 10, this procedure review is a review of the Logic System Functional Tests, Simulated Automatic Actuation Tests and Plant Design Change post-work tests to determine if any were changed or affected by modifications implemented since October 1987 when all these procedures were last validated. This review is expected to be completed within approximately two weeks. The August 22 date refers to the date all testing is expected to be completed.

3. Regarding Action 3 on Page 13, I&C valve lineups will be performed using the upgraded procedure to ensure system readiness to support restart.

4. Regarding Action 6.b on Page 14, the actions scheduled by August 1 include convening the task force, establishing corrective actions, and developing a schedule to implement corrective actions.

5. Regarding Action 2 on Page 15, personnel receiving communications training includes I&C personnel.

6. Regarding Actions on Page 16, I&C personnel have received training on RFO-7 modifications.

AUG 05 1988

MEMORANDUM FOR: Samuel J. Collins, Deputy Director
Division of Reactor Projects

THRU: James T. Wiggins, Chief
Reactor Projects Branch No. 3 JTW 8/4/88

A. Randy Blough, Chief
Reactor Projects Section No. 3B ARB 8/4/88

FROM: Lawrence T. Doerflein, Project Engineer
Reactor Projects Section No. 3B

SUBJECT: REVIEW OF BOSTON EDISON COMPANY'S RESTART READINESS SELF-ASSESSMENT

This memorandum forwards a report of the results of the NRC staff review of the Boston Edison Company (BECo) restart readiness self-assessment report and process. The review was conducted on site during June 20-24, 1988, by Glenn Meyer, Senior Resident Inspector, Hope Creek; Frank Akstulewicz, PSTB, NRR; and myself (as team leader). Our conclusions, as stated in the report, were presented to Messrs. R. Bird and R. Ledgett at the end of our review. Overall, the NRC staff found that: (1) BECo's self-assessment process appeared thorough and the Management Oversight and Assessment Team was effective in screening a number of diverse inputs on plant and program status to develop and prioritize issues requiring resolution; (2) BECo has established, and plans to continue, various programs which are effective in assessing program and personnel performance; and (3) BECo has established plans and programs to satisfy the Confirmatory Action Letter 86-10 requirement for checklists to assure all outstanding items are satisfactorily resolved and plant systems properly restored for operation. No new issues were identified during the review which would negatively affect conducting the NRC Integrated Assessment Team Inspection.

Lawrence T. Doerflein

Lawrence T. Doerflein
Project Engineer

Enclosure:
As stated

Distribution (w/encl):
Restart Panel Members
Glenn Meyer
Frank Akstulewicz

ENCLOSURE

Report on the NRC Review of
Boston Edison Company's
Restart Readiness Self-Assessment

I. Background and Introduction

On April 12, 1986, Pilgrim Nuclear Power Station (PNPS) shutdown due to a series of recurring technical problems. At that time, Boston Edison Company (BECo) agreed in Confirmatory Action Letter (CAL) No. 86-10 to obtain NRC Region I Administrator approval prior to plant restart. Subsequently, most of the technical issues causing the shutdown were resolved. However, due to the number and scope of outstanding performance related issues identified in the 1985 Systematic Assessment of Licensee Performance (SALP) and subsequent Diagnostic Team Inspection (50-293/86-06), the Regional Administrator extended the requirements of the CAL in a letter dated August 27, 1986, to include submission of a written report documenting BECo's formal assessment of the readiness for restart operation.

On May 26, 1988, BECo submitted the Pilgrim Nuclear Power Station Self-Assessment of Readiness for Restart Report. The report summarizes the process and conclusions of BECo's self-assessment, focusing only upon the relatively discrete set of issues BECo management considered most important and worthy of greatest attention at that time. On June 7, 1988, NRC staff conducted an onsite, preliminary review of the basis for BECo's conclusions as documented in the self-assessment report. A detailed review of BECo's self-assessment process and the basis for the conclusions was conducted onsite June 20-24, 1988. The results of this detailed review are documented below.

II. Discussion and Evaluation

The Pilgrim Nuclear Power Station Self-Assessment of Readiness for Restart Report summarizes the process and conclusions of BECo's self-assessment but limited the discussion to a relatively discrete set of issues considered most important by BECo management. The objectives of the NRC staff onsite review of the self-assessment report and process were: to understand the contents of the self-assessment data base and BECo's methodology in reaching its conclusions; to determine if the self-assessment report satisfied the requirements of Confirmatory Action Letter 86-10; and to provide feedback to NRC management on the scheduling of the Integrated Assessment Team Inspection based on the status of BECo's corrective action programs and implementation schedules for those self-assessment issues requiring action prior to restart. The NRC review consisted of personnel interviews, staff observations, and record reviews. The following discussion provides the NRC findings relative to the stated objectives and includes: an overview of the self-assessment process; a description of the Management Oversight and Assessment Team (MO&AT) and the programs and screening process used; and CAL 86-10 status.

A. Self-Assessment Process Overview

In early 1987, BECo performed a series of self-assessments to identify/verify problem areas and determine the desired conditions. For each issue identified, corrective actions to achieve the desired condition were established, specific closure criteria developed, and responsible managers assigned. The assessments resulted in the PNPS Restart Plan, the Material Condition Improvement Action Plan (MCIAP), and the Radiological Action Plan (RAP). Specifically, the Restart Plan contained the programs, plans, and actions considered necessary by BECo management for the safe and reliable restart and continued operation of PNPS. It concentrated on specific activities to correct and prevent recurrence of weaknesses previously identified by NRC, the Institute of Nuclear Power Operations (INPO), and BECo. The Restart Plan also defined the basis for assessing restart readiness. The MCIAP and RAP, containing both restart and long-term actions, established programs to achieve long-term improvement in the material condition and overall quality of maintenance and radiological controls at PNPS.

In October 1987, also in response to the NRC August 1986 letter, BECo submitted the Power Ascension Program. This program established an oversight and assessment team, consisting of six senior level managers, to observe personnel and equipment performance during the Power Ascension Program, perform assessments at specific hold points, and confirm readiness for continued operation. In January 1988, this Management Oversight and Assessment Team (MO&AT) became functional in an expanded role. The number of team members was increased to eight and it became responsible for conducting the self-assessment of readiness for restart. A preliminary assessment by BECo line managers, with the results presented to MO&AT, was performed February 22 to March 11, 1988 to confirm PNPS readiness to conduct the full management self-assessment. MO&AT conducted the restart readiness self-assessment (RRSA) from April 19 to May 2, 1988, which included: team observations during plant and system walkdowns; personnel interviews; simulator observations; line manager interviews and presentations; and inputs from the peer evaluator, Quality Assurance (QA) surveillance monitoring and management monitoring programs. The results of this full assessment are documented in Self-Assessment of Readiness for Restart Report submitted by BECo on May 26, 1988. Details on the process used by MO&AT and the findings and conclusions reached are discussed below. A chronological listing of the significant self-assessment milestones is attached.

B. Management Oversight and Assessment Team (MO&AT)

The core of the BECo restart readiness self-assessment has been the Management Oversight and Assessment Team (MO&AT). The MO&AT provided the ultimate review of the numerous outage work completion programs, e.g., Restart Regulatory Responses, MCIAP, RAP, etc., while concurrently using its own assessment of activities at Pilgrim to interact with the line managers directly responsible for the activities. More specifically, during intensive meetings over approximately four weeks, MO&AT reviewed the completion status of all functional elements of the Pilgrim Station based on the presentations of the responsible managers. Despite the importance of this content review of the functional elements, an equally important aspect of the MO&AT review was the process of the senior managers on MO&AT interacting with the responsible managers regarding the acceptance standards for the work and the manner in which it was to be completed. The NRC staff judged this interactive process to be a critical part in the changing of the previously held attitudes at Pilgrim, which may have caused previous self-improvement programs at Pilgrim to be of only limited success and duration.

The MO&AT is composed of eight senior managers, including the Senior Vice President - Nuclear, who acts as the Chairman. The staff found that the MO&AT members have responsibility in all functional areas, including station operations, engineering, and quality assurance. Further, three MO&AT members had been BECo managers prior to the arrival of the Senior Vice President - Nuclear, while the remaining five managers joined BECo subsequent to February 1987. Also, four of the MO&AT members had significant management experience in the Navy nuclear program. The staff judged the diverse backgrounds, experience, and responsibilities of the MO&AT members to be an advantage in assessing the activities at Pilgrim.

To evaluate the MO&AT review process, the staff reviewed the RRSA, reviewed the records of the MO&AT meetings, and interviewed MO&AT members and line managers regarding the MO&AT review process. In addition, parts of the MO&AT meetings were directly observed by other NRC inspectors during inspection 50-293/88-17 and by the resident inspectors. The most direct MO&AT/line management review occurred during a preliminary review from February 22, 1988 to March 11, 1988, and during a subsequent review from April 19, 1988 to May 2, 1988. A MO&AT member estimated that these review meetings had totaled approximately a hundred hours. Written records of these meetings are minimal as the process appears to have been largely oral.

In addition to the line manager presentations, the MO&AT members received oral presentations and individually reviewed written reports concerning other BECo assessments, i.e., Peer Evaluation Program, Management Monitoring Program, and QA Surveillance Monitoring Program (discussed below). Further, an integral part of the MO&AT review was the actual review of field work and equipment conditions by MO&AT members. The two MO&AT/line manager review periods were preceded by planned equipment walkdowns, record reviews, interviews with plant personnel, and observations of operating crew performance on the simulator. Also, the MO&AT members followed up on line manager presentations to confirm that field observations were consistent with the managers' assessments. A MO&AT member estimated that he had spent two hours in the field for each hour in MO&AT review meetings.

As stated earlier, MO&AT received significant inputs from many diverse programs. A description of the programs which contributed to the overall assessment process are described in turn.

1. Line Manager Presentations

The restart readiness self-assessment began with responsible line managers assessing the readiness of their functional area. The results of these assessments were formally presented to MO&AT during the preliminary review February 22 to March 11, 1988, and a subsequent review April 19 to May 2, 1988, and were the basis of BECo's self-assessment. MO&AT supplemented the line manager assessments during the presentations with the team's own observations based on plant tours, personnel interviews, and information from the peer evaluator, management monitoring and QA surveillance programs to develop a list of issues requiring further followup action. Those issues requiring corrective action prior to restart are identified in Section II.A of BECo's self-assessment report.

The areas to be covered during the line manager presentations were specified by memorandum. The presentations were an oral report of the current status of all actions required for restart, major open areas and areas of uncertainty, and the actions in place or needed to address the open areas or areas of uncertainty. Specifically, the presentations addressed: restart plan, MCIAP and RAP status; the status of INPO action items; and updated evaluation of the Systematic Assessment of Licensee Performance (SALP) 86-99 concerns which also included relevant portions of any subsequent NRC inspection report and relevant BECo experience since the SALP; and the line managers overall observations or conclusions concerning readiness. During the preliminary review, the presentations were made by the

seven department managers. The subsequent review involved presentations by twenty managers. The NRC staff interviewed several line managers who gave presentations and MO&AT members who participated in the presentations to evaluate the process. Each of the managers indicated that the presentation sessions were thorough and rigorous; that MO&AT was well informed on plant problem areas and asked probing questions; and that the developed list of issues represented the weaknesses and potential problem areas at PNPS.

Based on the NRC staff review, which consisted largely of interviews, the staff concluded that the line manager assessments forming the basis for BECo's self-assessment were appropriately supplemented and verified by MO&AT; and that the presentations and process appeared thorough.

2. Peer Evaluation Program

The Peer Evaluation Program is a BECo initiative to have knowledgeable personnel review work in progress within their field of expertise. Seven different functional areas are covered. Although specifically created to review work during the power ascension phase, BECo senior management stated that the program is tentatively planned to be extended indefinitely to evaluate routine operations. The staff reviewed the program to evaluate its effectiveness thus far and its potential to assess work during reactor operations.

The staff found that the program included 14 evaluators, who had been nominated by their supervisors and accepted by the program coordinator in late 1987. These evaluators received 20 hours of training and performed two practice evaluations with the training staff. The staff reviewed Nuclear Organization Procedure (NOP) 88A1, Performance Standards and Evaluation Guidelines, which represents the specific standards which the evaluators utilize, and found the procedure to be thorough and a suitable standard for evaluation. A second set of eight evaluators was being trained to augment these 14 evaluators.

The staff interviewed three evaluators and found that although they had initially been skeptical, the evaluators appeared to be highly supportive of the Peer Evaluator Program. The evaluators acknowledged that evaluating the work of others within their field had potential problems, but all evaluators interviewed stated that the process was workable. In discussions with an evaluator and the Senior Vice President - Nuclear, the staff confirmed that the Senior Vice President - Nuclear had intervened in one instance to resolve a personnel conflict and to reaffirm the intent of the evaluation program.

Based on discussions with the program coordinator, attendance at an evaluator meeting, and review of records, the staff found that the evaluator's findings are documented and sent to the responsible line manager for corrective action. The findings are tabulated and trended according to procedure, personnel, and plant equipment problems and strengths. MO&AT members receive reports with finding summaries and trend analyses. As of June 20, 70 evaluations had been performed and had found 74 problems.

The staff reviewed a sample of evaluator findings and found them to be substantive, specific descriptions of work practices either not meeting the intent of existing procedures or in need of upgrading. In previous discussions with the staff, MO&AT members stated that work needed to meet rising standards. The staff noted that this theme had been effectively communicated to the evaluators during their training and was evident in the evaluators' findings. Also, in later evaluations of the follow-up items resulting from the MO&AT review, the staff noted that problems in field activities documented in some followup items had been earlier identified in evaluator findings. However, due to the nature of the MO&AT review, the staff could not determine whether the followup items came directly from the Peer Evaluation Program or from MO&AT member observations or line manager presentations.

The program coordinator discussed corrective actions which had resulted for some of the problems identified by the evaluators. Although no formal system existed to specifically close out and track corrective actions on the evaluators' findings, the program coordinator stated that work was underway to establish a clearinghouse to funnel the findings into existing corrective action systems. Despite the past lack of a formal corrective action system to handle findings developed during the self-assessment process, it was evident that corrective actions had occurred as line managers responded to correct the identified problems.

The staff noted that although program discussions included engineering/technical support as a functional area and an engineering evaluator had been trained, the NOP did not include standards for this area and no evaluations had been performed yet. The program coordinator acknowledged that progress in this area had not been equal to the other areas more directly related to field activities, but he stated that future evaluations in engineering were still planned.

The staff concluded that the Peer Evaluation Program was a well thought-out effort with good management support to identify problems in work in the field. The staff concluded that the selection and training of the evaluators had been effective. The staff judged that the program could be used effectively to evaluate plant activities during reactor operations. Further, the staff concluded that the Peer Evaluation Program provided good potential for improving the standards and attitudes of field workers, because knowledgeable co-workers provide independent evaluations of the work performed to the workers and their supervision.

3. Management Monitoring Program

The Restart Plan and the Self-Assessment for Readiness for Restart Report (RRSA) refer to management monitoring processes which BECo has been using to identify plant deficiencies and to correct identified problems as well as improve general housekeeping at the plant. The management monitoring processes mentioned in the reports listed above, began in August 1987. The initial program called the Management Monitoring Program was designed to use at least first-line supervisors for direct management observations of the performance of station personnel as well as the material condition of the plant. While the program required that a record be made of the observations, the followup of any identified items was left to the responsible technical group. There was no formal closeout process established to assure the timely completion of identified items.

During the period November 1987 through March 1988, a subset of the program members participated in a special management review of control room operations. During this period, the management monitoring team observed control room operators 24 hours a day with the intent of improving the performance of control room operators in the control room.

During March and April 1988, the structure of the management monitoring process was modified from the use of individual manager observations to a team observation concept. The program was subsequently renamed the Management Watch Program (MWP) and the focus of the program was directed primarily to maintaining the material condition of the plant and general housekeeping matters. The first management tour under the revised program occurred on April 5, 1988.

The MWP consists of a team of six to eight first-line supervisors from different organizational units under the direction of a team leader. Once a week, the team of managers performs a one to two hour inspection of specific areas in the plant. Following each management tour or inspection, the team leader prepares a tour report which identifies the specific areas reviewed during the inspection tour and assigns responsibility for assurring that any identified deficiencies are corrected. Unlike the earlier version of the program, the MWP contains a formal requirement to respond to a MWP coordinator following resolution of each item. Further, failure to correct items is also monitored and brought to senior station management attention, as the need arises.

The MWP is not currently a program defined by formal plant procedures. The station management has directed that a formal procedure be prepared which defines this program but no completion date for this effort was available.

During this review, the NRC staff was able to directly observe a regular MWP inspection tour (identified as Management Tour 88-11). The team leader for this tour was the principal operations engineer. The other members of the team included the maintenance supervisor, the health physics supervisor, the construction management supervisor, the chief chemical engineer, the manager of the systems engineering division and the station services supervisor. Although he is not a routine tour member, the station director participated in this particular inspection tour.

Tour 88-11, which lasted about one and one-half hours, inspected the refueling floor and elevations 81 feet and 74 feet of the reactor building. These areas contain equipment for fuel handling, the standby liquid control system and reactor building ventilation. This staff concluded that the tour was very thorough in its inspection of the material condition of the plant. Any findings were discussed within the group and, in particular, with the responsible supervisor to assure that the findings would be resolved promptly. A report of the tour findings and required followup actions was issued by the team leader.

Based on the staff's review, it appears that the Management Watch Program is an effective tool for use by station management in identifying deficiencies in the material condition of the plant or for general housekeeping matters. Current management attention and support for the program is high and the formal followup process provides an adequate method for tracking the resolution of all MWP findings.

4. Quality Assurance (QA) Surveillance Monitoring Program

The purpose of the QA Surveillance Monitoring Program is to observe routine operating activities using compliance-to-procedure and performance based surveillances. The program, which was initiated in 1984, is described in the Boston Edison Quality Assurance Manual (BEQAM) and implemented through QA procedures and instructions by the onsite QA Surveillance Monitoring Division. This division is staffed with eight engineers of diverse expertise including two qualified reactor operators. Each engineer is certified as a lead audit per ANSI N45.2.23. The QA surveillances are performed in all functional areas.

The staff interviewed the line managers responsible for implementing the QA surveillance monitoring program and reviewed the various records and reports generated to evaluate the scope and effectiveness of the program. Surveillance schedules are prepared monthly. The staff noted that the scheduled surveillances cover all functional areas and are specified by implementing procedures. Additional surveillances are added at management discretion based on observed trends, industry experience feedback, etc. Checklists are prepared and completed for each surveillance. Discrepancies noted during the surveillance monitoring are recorded on a Deficiency Report (DR) in accordance with the BEQAM. Responsible line managers are required to disposition the DR and QA then verifies the completion and effectiveness of the corrective actions. Monthly status reports are also issued which lists the surveillances performed the previous month and summarizes the findings which includes DRs issued, recommendations, and the Immediate Corrective Actions (ICA) taken. In addition, a quarterly report is issued which, using a years worth of data, trends positive and negative findings. All the reports associated with the QA surveillance monitoring report are distributed to line management, including MO&AT.

MO&AT used the QA surveillance findings to identify or confirm potential problem areas. In addition, an overview presentation of the QA surveillance monitoring program was given to MO&AT. As a result, MO&AT raised the issue that the program, because it was basically looking at regulatory compliance, was too narrow. This resulted in the initiation of a program upgrade. The improvements will include revising procedures to ensure other areas, such as housekeeping and material condition, are observed during the surveillances and providing the QA inspectors with peer evaluator and INPO observer training.

Based on the staff review, it appears the QA surveillance monitoring program was a useful tool in BECo's self-assessment process. The program emphasizes monitoring ongoing, in-plant activities rather than record audits and as such provided an additional, independent source of information for assessing personnel and program performance. The program identified significant issues such as the environmental qualification program and drawing update control implementation problems. Finally, of all the processes used by MO&AT, the QA surveillance monitoring program is the most formalized, with well defined procedures for implementation and resolution of deficiencies.

C. Management Oversight and Assessment Team Results

In the sections above, the staff described the various programs used by the licensee as sources of information for use in performing the self-assessment for restart readiness at the Pilgrim Station. The following is a discussion of the process which led to the generation of the action items required for restart as currently identified in Section II.A of the RRSA.

The restart readiness self-assessment process occurred from April 19 through May 2, 1988. As noted above, MO&AT served as the central or screening committee for the overall self-assessment effort. As part of this process, MO&AT reviewed individual MO&AT member observations or concerns, conducted interviews with line managers, and received presentations on the status of issues raised during the peer review process, management reviews and quality assurance inspections. During the line managers interviews and presentations, any individual observation or a series of similar observations considered significant by at least one member of MO&AT was identified by MO&AT as a self-assessment item requiring additional followup action. This list of "MO&AT issues" in general contained specific issues such as instrument valve lineup control and labelling problems or a noted training deficiency. However, the staff noted that during the course of the self-assessment, the MO&AT members may have identified several examples of the problem for any given MO&AT issue. This collective list of individual findings or examples of problems identified by MO&AT is termed the "MO&AT field notes."

After developing the list of issues, MO&AT prioritized them into four categories. These categories were:

(1) Action required in order to support publication of the RRSA.

(2) Action required in order to support the restart of the plant.

(3) Action required prior to completion of the power ascension program.

(4) Long-term actions following plant restart.

Each of the self-assessment issues identified by MO&AT during the screening process was placed into one of the categories listed above. The staff reviewed the categorization of each issue identified by MO&AT to assure it was properly prioritized. The staff also reviewed the status of the Category 2 issues to assure that planned corrective actions were scheduled and would be completed prior to restart. The Category 2 issues appear in the BECo Self-Assessment Report as Section II.A "Matters Relating to Plant and Equipment Performance, Operational Performance, and Management and Organization that Require Specific Action Before Restart." The licensee indicated MO&AT would verify closure of the Category 1 and 2 issues.

One of the actions described in Section II.A.1 of the licensee's RRSA is the creation of a "corrective action clearinghouse." During the review of the licensee's self-assessment process, the staff reviewed the licensee's plans and implementation of the clearinghouse. The staff did encounter some difficulty in understanding the program because the clearinghouse concept, purpose, and responsibilities were not defined in writing at the time of our review. As a result, the following discussion is based primarily on information obtained from discussions with the clearinghouse coordinator.

The clearinghouse is a licensee program which will be implemented to assure that all deficiencies described in the MO&AT field notes or in peer evaluator reports have been resolved or have been assigned to a responsible group for resolution. It is also the intent of the clearinghouse to maintain a record of the completion of each deficiency. In particular, the staff understands the clearinghouse responsibilities to be:

1. The review of deficiencies contained in the MO&AT field notes and peer evaluator reports to determine if the necessary maintenance requests, deficiency report, nonconformance report, etc. had been prepared for resolution of the specific item.

2. The preparation of the necessary paperwork to assure resolution of a particular item if the appropriate paperwork had not been previously prepared.

3. The establishment of a tracking system for the resolution of identified items which may not conform to any of the existing plant tracking systems.

4. The establishment of reporting requirements for resolution of identified items.

5. The maintenance of records or references of the completion or resolution of each identified item.

The clearinghouse coordinator stated that meetings had been scheduled with each of the plant system engineers to begin in early July as a primary effort to resolve a number of the specific items.

During the staff review, June 20-24, the clearinghouse licensee's program was only in the beginning stages of implementation and all specific details of the program had not yet been completely established. As a result, the staff was not able to reach any conclusions concerning the completeness or implementation of the licensee's corrective action clearinghouse program.

Based on the staffs review, it appears BECo's self-assessment process was effective and thorough. MO&AT identified a list of issues requiring followup actions based on information from several sources and from line manager assessments. The staff concluded that MO&AT properly classified the issues into the four categories discussed above. The staff also concluded that the MO&AT field notes and peer evaluator reports need to be reviewed to ensure all deficiencies are properly resolved; however, no conclusions could be reached on the adequacy on the "clearinghouse" in accomplishing this task given the early stage of program definition and implementation.

D. Confirmatory Action Letter (CAL) No. 86-10

The August 27, 1986 update to CAL 86-10 requiring the formal assessment of readiness for restart operation also requested that the assessment include a detailed check list for assuring that all outstanding items were satisfactorily resolved and that plant systems have been restored and prepared for operation.

As noted above, the Restart Plan concentrated on activities to correct and prevent recurrence of previously identified weaknesses. Specifically, the Restart Plan, Volume 2, Appendix 10, "Restart Regulatory Commitments", identifies the action items developed to address NRC concerns. Initially, Appendix 10, submitted with the Restart Plan, Volume 2, Revision 1, on October 26, 1987, contained 450 items, the majority of which addressed Systematic Assessment of Licensee Performance (SALP) 86-99, CAL 86-10, and management meeting 86-41 issues. Commitments from NRC inspections or other NRC-BECo correspondence made after October 26, 1986 were added to Appendix 10, such that the May 26, 1988 revision contained 524 items. Of these, 498 are restart issues of which 412 have been completed and closed.

The staff reviewed the action item closure process and found it to be formal and rigorous. Specific acceptance criteria were developed for each item. Responsible managers verified completion of the item which then was reviewed by two additional levels of management for acceptance and closure. An independent third party, in this case members of the compliance group, was used to verify adequacy and completion of the item. The MCIAP and RAP issues followed a similar closure process. Finally, MO&AT received line manager presentations on the restart plan action item status during the RRSA.

As stated in the Restart Plan, one of the bases for BECo's self-assessment of PNPS readiness for restart was that system group reviews would be completed and restart actions identified by those reviews would be closed or specifically scheduled in the approach to startup. The May 26, 1988 update to Appendix 12, "System Summary Status Report," of the Restart Plan provides the results of these reviews and information on system status. The report provides an overview and addresses major work or significant issues affecting the system. A similar report is issued approximately monthly to BECo management. This practice is expected to be formalized and continued.

While Appendix 12 provides an overview, System Status Books are maintained by system specialists who are assigned responsibility for tracking work on specific systems. The staff reviewed the System Status Book for the Residual Heat Removal System and found it contained a detailed system status which included: a listing of all priority 1-5 work items on the system; all surveillance testing status; the results of the weekly system walkdowns; current maintenance request listing; and, the startup checklist. As with other Restart Plan items, MO&AT received detailed line manager presentations on system status.

In addition to Appendix 12, BECo uses a system of checklists to track the completion of designated milestones leading to restart and operation of PNPS. Appendix 10, item 01-009-09, references the Operating Condition Checklist No. 6, "Pre-Critical Tests/Plant Startup", which identifies those items required to be resolved prior to restart. The checklist is maintained on an automated data base and is coordinated by a staff assistant to the Senior Vice President-Nuclear. Each item on the checklist has a responsible individual and manager assigned to complete the item. The staff reviewed checklist No. 6 and found it to be a detailed listing and included verification of items such as: system operability (surveillance testing and valve lineups); maintenance requests; modification packages; QC deficiency reports; engineering support requests, and NRC commitments from inspections or bulletins. The staff also noted that completion of the checklist is required to be reviewed and approved by the Operations Review Committee prior to plant startup.

Based on the above, the staff concluded that BECo had systems or programs in place to ensure all outstanding items are resolved and that systems would be properly restored prior to restart.

III. Conclusions

In conclusion, the staff has reviewed the self-assessment process used by the licensee at the Pilgrim station. Based upon our own observations, our discussions with station personnel and our review of the self-assessment records, the staff has concluded that:

1. The Management Oversight and Assessment Team was the core of BECO's self-assessment. MO&AT was effective in screening a number of diverse inputs on plant and program status to develop a list of issues requiring resolution. These issues were properly classified to identify those requiring resolution prior to plant restart. Overall, the self-assessment process appeared thorough and rigorous.

2. The peer evaluator program, management watch program, and the QA surveillance monitoring program were all effective tools in assessing plant and personnel performance and identifying deficiencies. Management support for these programs is high and management indicated these programs would continue.

3. The programs in place, including the Restart Plan (Appendices 10 and 12) and the Operating Condition Change Checklist, appear to satisfy the CAL requirement that detailed checklists be developed to assure all outstanding items were satisfactorily resolved and that plant systems are restored and prepared for operation.

4. The corrective actions and schedules for those issues requiring specific action prior to restart appear adequate. There were no new issues identified during the NRC staff review which would negatively affect conducting the NRC Integrated Assessment Team Inspection. Issues, including emergent issues such as NRC Bulletin 88-05, "Potential Nonconforming Materials Supplied by Piping Supplies, Inc. and West Jersey Manufacturing Company," are being actively tracked by Boston Edison Company.

ATTACHMENT

Self-Assessment Milestones

Date	Event
April 12, 1986	Pilgrim shutdown; Confirmatory Action Letter (CAL) No. 86-10 issued
August 27, 1986	NRC letter extending requirements of CAL to include a formal assessment of readiness for restart
July 29, 1987	NRC-Boston Edison Company (BECO) Management Meeting (No. 50-293/87-28) to discuss licensee approach to restart assessment
July 30, 1987	BECo submits Restart Plan and Material Condition Improvement Action Plan (MCIAP)
October 15, 1987	BECo submits Power Ascension Program
October 26, 1987	BECo submits Volume 2, Revision 1 (updated results) for the Restart Plan
December 30, 1987	BECo submits Radiological Action Plan (RAP)
January 4, 1988	BECo submits Appendix 7 to Volume 2 of the Restart Plan, "Summary Status of Restart Actions in RAP"
February 24, 1988	NRC-BECo Management Meeting (No. 50-293/88-10) to discuss BECo's self-assessment process designed to determine readiness for requesting restart permission
February 22 - March 11, 1988	BECo's preliminary assessment
April 19 - May 2, 1988	BECo's Restart Readiness Self-Assessment
May 26, 1988	BECo submits the Self-Assessment of Readiness for Restart Report and Volume 2, Revision 2 for the Restart Plan

APPENDIX F

Correspondence Concerning Staff Review and Acceptance of Boston Edison Company (BECo) Power Ascension Program

Letter	Subject
BECo to NRC dated, October 15, 1987	Submission of Power Ascension Program
NRC to BECo dated, January 28, 1988	NRC Request for Additional Information (RAI)
BECo to NRC dated, February 29, 1988	BECo Response to RAI
NRC to BECo dated, May 17, 1988	Minutes of Management Meeting on April 8, 1988
BECo to NRC dated, August 4, 1988	Rosemount Transmitter Ringing
BECo to NRC dated, August 31, 1988	Submission of Revised Power Ascension Program
NRC to BECo dated, September 7, 1988	Minutes of Management Meeting on August 31, 1988
NRC to BECo dated, September 7, 1988	Acceptance of BECo's Power Ascension Program

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
475 ALLENDALE ROAD
KING OF PRUSSIA, PENNSYLVANIA 19406

07 SEP 1988

Docket No. 50-293

Boston Edison Company
ATTN: Mr. Ralph G. Bird
Senior Vice President - Nuclear
800 Boylston Street
Boston, Massachusetts 02199

Gentlemen:

SUBJECT: PILGRIM NUCLEAR POWER STATION POWER ASCENSION PROGRAM

This letter refers to the NRC staff review of the Pilgrim Nuclear Power Station Power Ascension Program (Revised), as submitted by Boston Edison Company (BECo) in a letter dated August 31, 1988. The NRC staff has completed its review of the plan, as well as your initial submittal of the plan dated October 15, 1987, and your February 29 and August 4, 1988 responses to the NRC's requests for additional information.

During a Management Meeting on April 8, 1988, three issues were identified as requiring additional NRC review: analysis of the affect of plant modifications on the dynamic response of the plant, review of approved procedures TP87-114 and TP87-147, and Rosemount transmitter "ringing" concerns. The first two issues were resolved based on staff inspection and management review of these issues. The Rosemount transmitter concerns were resolved based on the information provided at a meeting in Region I on August 31, 1988.

As a result of the above reviews, the NRC staff has concluded that the Power Ascension Program provides an adequate plan which satisfies the NRC's request for a formal restart program and schedule, as described in the August 27, 1986 update to Confirmatory Action Letter (CAL) 86-10. Further, we have determined that the five NRC Approval Points proposed in your Power Ascension Program are approved. Successful implementation of the proposed Power Ascension Program is necessary for closeout of CAL 86-10. The NRC staff will form a conclusion regarding the effectiveness of the plan's implementation after completion of the Power Ascension Program and review of the program results.

No reply to this letter is required. Your cooperation in this matter is appreciated.

Sincerely,

Thomas T. Martin

Thomas T. Martin, Director
Division of Reactor Safety

cc:
K. Highfill, Station Director
R. Anderson, Plant Manager
J. Keyes, Licensing Division Manager
E. Robinson, Nuclear Information Manager
R. Swanson, Nuclear Engineering Department Manager
The Honorable Edward J. Markey
The Honorable Edward P. Kirby
The Honorable Peter V. Forman
B. McIntyre, Chairman, Department of Public Utilities
Chairman, Plymouth Board of Selectmen
Chairman, Duxbury Board of Selectmen
Plymouth Civil Defense Director
P. Agnes, Assistant Secretary of Public Safety, Commonwealth of Massachusetts
S. Pollard, Massachusetts Secretary of Energy Resources
R. Shimshak, MASSPIRG
Public Document Room (PDR)
Local Public Document Room (LPDR)
Nuclear Safety Information Center (NSIC)
NRC Resident Inspector
Commonwealth of Massachusetts (2)

UNITED STATES
NUCLEAR REGULATORY COMMISSION
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475 ALLENDALE ROAD
KING OF PRUSSIA, PENNSYLVANIA 19406

SEP 07 1988

Docket No. 50-293

Boston Edison Company
ATTN: Mr. Ralph G. Bird
Senior Vice President - Nuclear
800 Boylston Street
Boston, Massachusetts 02199

Gentlemen:

Subject: Meeting to Discuss Rosemount 1153 Transmitters

This letter transmits the NRC report of the meeting held on August 31, 1988 in the Region I office, King of Prussia, Pennsylvania to discuss NRC concerns regarding the Rosemount 1153 transmitter "Ringing" issue.

As a result of this meeting, the NRC staff concluded that the BECO approach to resolve potential Rosemount 1153 transmitter "Ringing" problems at the Pilgrim station is acceptable.

No reply to this letter is required. Thank you for your cooperation.

Sincerely,

Thomas T. Martin, Director
Division of Reactor Safety

cc w/encl:
K. Highfill, Station Director
R. Anderson, Plant Manager
J. Keyes, Licensing Division Manager
E. Robinson, Nuclear Information Manager
R. Swanson, Nuclear Engineering Department Manager
The Honorable Edward J. Markey
The Honorable Edward P. Kirby
The Honorable Peter V. Forman
B. McIntyre, Chairman, Department of Public Utilities
Chairman, Plymouth Board of Selectmen
Chairman, Duxbury Board of Selectmen
Plymouth Civil Defense Director
P. Agnes, Assistant Secretary of Public Safety, Commonwealth of Massachusetts
S. Pollard, Massachusetts Secretary of Energy Resources
R. Shimshak, MASSPIRG
Public Document Room (PDR)
Local Public Document Room (LPDR)
Nuclear Safety Information Center (NSIC)
NRC Resident Inspector
Commonwealth of Massachusetts (2)

U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Meeting No. 50-293/M88-312

Docket No. 50-293

License No. DPR-35

Licensee: Boston Edison Company

Facility Name: Pilgrim Nuclear Power Station

Meeting Location: NRC Region I, King of Prussia, Pennsylvania

Meeting Date: August 31, 1988

Prepared by: CJA for L. Cheung — 9/6/88
L. Cheung, Sr. Reactor Engineer — date

Approved by: C J Anderson — 9/6/88
C. Anderson, Chief Plant Systems Section — date

Conference Summary:

A technical meeting was held on August 31, 1988, in the Region I office to discuss NRC's concerns regarding a Rosemount 1153 transmitter "Ringing" problem that had occured in two Region I plants, and to discuss Boston Edison's approach to resolve this issue for the Pilgrim station.

DETAILS

1.0 Conference Attendees

Boston Edison Company (BECO)

S. Dasgupta, Control Systems Division Manager
P. Hamilton, Compliance Division Manager
D. Richard, Control Systems Principal Engineer
R. Williams, Sr. System and Safety Analysis Engineer

United States Nuclear Regulatory Commission

J. Durr, Chief, Engineering Branch
C. Anderson, Chief, Plant Systems Section
N. Conicella, Operation Engineer
L. Cheung, Sr. Reactor Engineer

2.0 Background and Purpose of Meeting

Rosemount 1153 transmitter "Ringing" problems which caused reactor trips and inadvertent actuation of engineering safeguard systems were identified at Hope Creek and Nine Mile 2 during their startup periods. A letter was sent to the licensee from the NRC on January 29, 1988, identifying this as one of the six issues to be addressed for the Pilgrim Power Ascension Program. The licensee responded to all six issues in their February 29, 1988 letter to the NRC. Subsequently, a management meeting was held in the Region I office on April 8, 1988, to discuss the overall power ascension program. During that meeting, the licensee committed to submit a separate response to the NRC's concerns regarding "Ringing" problems associated with Rosemount 1153 transmitters.

The licensee submitted their response (BECO Letter No. 88-117) on August 4, 1988. This letter addressed the licensee's approach to resolve the NRC's concerns for the "Ringing" problem. Since several technical issues discussed in this letter were not clear to the NRC, a meeting was requested by the NRC to discuss these technical issues. This resulted in the current meeting being held on August 31, 1988.

3.0 Meeting Summary

The meeting was opened by J. Durr, Chief, Engineering Branch of NRC. P. Hamilton, Compliance Division Manager of BECO outlined the scope of BECO's presentation. The technical elements of BECO's approach to resolve the Rosemount 1153 transmitter "Ringing" problem were presented by R. Williams, Senior System and Safety Analysis Engineer of BECO.

The following summarizes the technical elements of the licensee's presentation:

a) The "Ringing" problems at Hope Creek and Nine Mile 2 were due to high frequency (3 to 20 Hz) harmonic type mechanical noise (pressure pulses).

b) This mechanical noise was probably caused by:
- Air in instrument lines from flexible hose or routing considerations (e.g., sloping, low points etc.)
- Long runs of small bore tubing
- Instrument tubing support (long unsupported spans)

c) The Rosemount 1153 transmitters used at Hope Creek and Nine Mile 2 were fast response type (60 milliseconds), therefore, these transmitters see this noise.

d) The Rosemount 1153 transmitters used at Pilgrim for reactor water level measurements contain filters which increase the response time to 350 to 500 milliseconds, thus filtering out the 3 to 20 Hz harmonic noise.

e) Pilgrims's instrument lines contain no flexible hose, are properly routed and supported, and consist of short instrument tube runs.

f) Other operating plants (Monticello, Hatch, Vermont Yankee, and Dresden) with similar instrument installation did not have inadvertent trips of this nature.

Other topics, such as the Plant Information Computer System (EPIC) and main steam flow measurements, were also discussed at the meeting. The licensee presentation is outlined in their handout which is provided as Attachment A to this report.

4.0 Conclusion

The NRC staff agreed with the licensee's conclusion that it is unlikely that the problem of Rosemount 1153 transmitters will cause unnecessary trips at the Pilgrim station.

Attachment A

Rosemount 1153 Transmitter "Ringing"Issue

(Monitoring at Pilgrim Station)

Presentation to the NRC
August 31, 1988

Trips at Newer BWR's Alert Industry To Rosemount Transmitter Sensitivity Problems

- Hope Creek and Nine Mile 2 Reported Inadvertent SCRAMS Resulting from Reactor Water Level Signal Noise

- Industry was Notified of the Problem by GE

- GE Issued RICSIL 12 With Supplement and SIL 463
  - RICSIL 12 With Supplement - Provided Information Based on GE Investigations
  - SIL 463 - Provided Discussion, Recommended Actions, and Root Cause Analysis Guidelines

- Boston Edison Documented Problem (PCAQ NED 87-142, NED 87-187)

Hope Creek has Experienced Inadvertent Trips Involving Rosemount 1153 Transmitters

- **Turbine Stop-valve Closure caused Pressure Transient**
- **This Resulted in Inadvertent Trips From the Reactor Water Level system**
- **Trips Were Caused by the above Amplified Pressure Transients Being Detected by the Fast (60 millisecond) Response Time 1153 Transmitters**
- **Corrective Action was to Add Filter Capacitors to Slow the Response Times of the 1153 Transmitters to Under 300 ms**

Nine Mile Point 2 Has Experienced Inadvertent Trips Involving Rosemount 1153 Transmitters

- Inadvertent Trips Occurred During Startup Testing
- Process Perturbations Caused Pressure Transients
- Flex Hose Instigated or Amplified Pressure Transients in the Reactor Water Level Instrument Sensing Lines
- Instrument Line Slopes Contributed to Pressure Transients
- Trips Were Caused by the above Amplified Pressure Transients Being Detected by the Fast (60 millisecond) Response Time 1153 Transmitters
- Corrective Action was to Add Filter Capacitors to Slow the Response Time of the 1153 Transmitters to 300 ms

BECo Acts to Identify and Resolve Issue

- BECo Surveyed 10 BWR's for Problems
  - Nine Mile Point 1&2
  - Perry 1&2
  - Clinton
  - Quad Cities
  - Dresden
  - Grand Gulf
  - Limerick
  - Monticello
  - Fitzpatrick
  - Hope Creek
- Evaluated Pilgrim's Succeptibility

Sensitivity Linked to Combination Of Process Noise and Instrument Line Characteristics

- **Only Rosemount 1153 DB5 Transmitters with Fast Response Times (less than 60 milliseconds) are Sensitive to Process Noise**
  - **Noise (Ringing) Frequency Between 3 & 20 Hz**

- **Noise Effects can be Aggravated by:**
  - **Air in Instrument Lines From Flexible Hose or Improper Routing (e.g., sloping, low points etc.)**
  - **Long Runs of Small Bore Tubing**
  - **Improper Instrument Tubing Support (unsupported spans too long)**

- **Inadvertent Trips Have Resulted From Combination of Noise, Transmitter Sensitivity, and Instrument Line Anomalies.**

Random Noise is A System Response to Process Variables

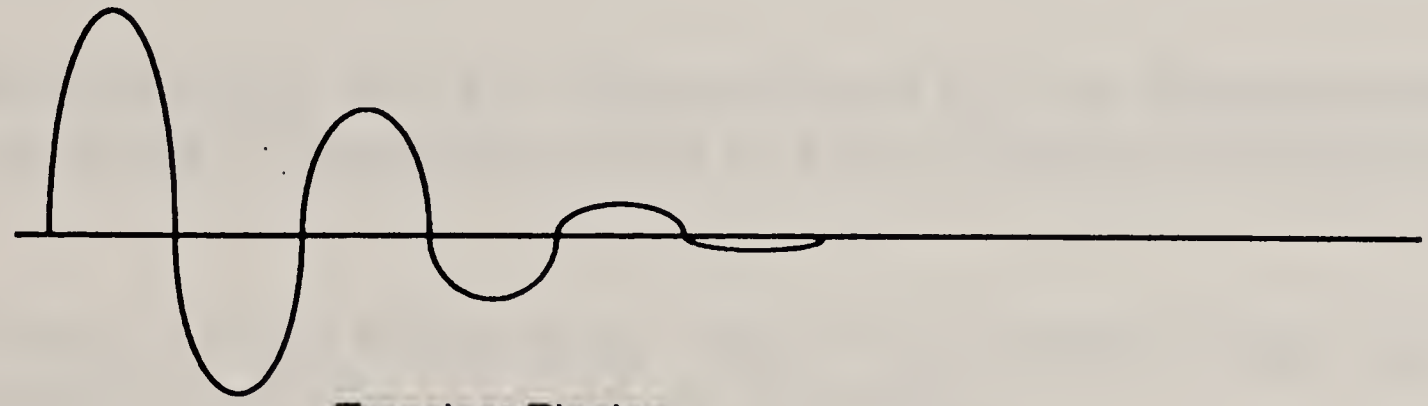
- **Process Noise**
  - **Random Noise is Inherent in All Dynamic Systems**
  - **This Noise is Independent of any Resonance in the System**

Random Process Noise

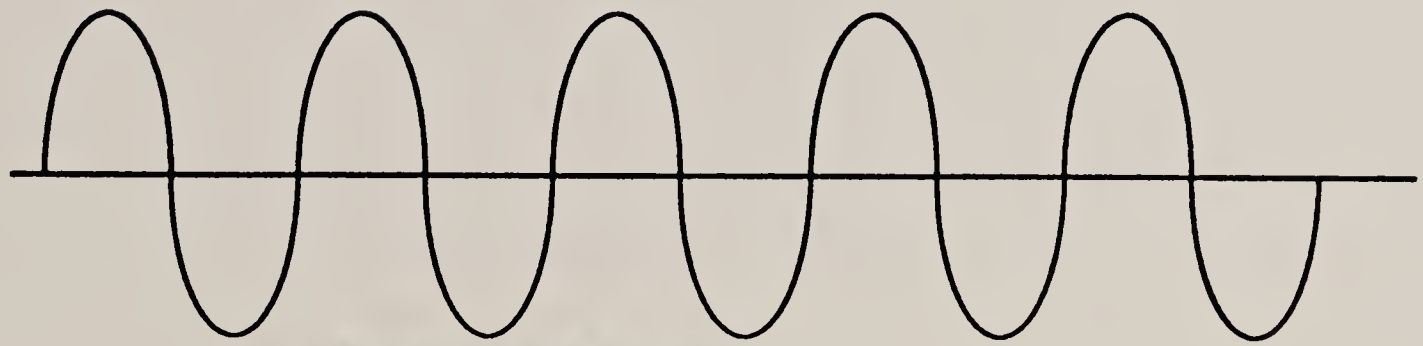
Ringing Is a Characteristic Response to a Stimulus

- **Every System Has a Characteristic Resonant Frequency at Which it will Vibrate in Response to an Appropriate Stimulus**

- **The Stimulus can be Transient or Continuous in Nature Resulting in Transient or Continuous Ringing**



Transient Ringing



Continuous Ringing

The Rosemount Transmitter Does Not Ring

- **The Rosemount 1153 Transmitters are Inherently Overdamped and cannot Ring**

- **The Rosemount Transmitter output can Only Reflect the System Variable it is Monitoring**

- **System Ringing will be Reproduced by the Rosemount output if the Transmitter has a Fast Enough Response Time**

- **Therefore a Fast Response Time Transmitter may give the Appearance of Ringing When it is Not**

Pilgrim Has Two Applications Which Require Review for Transmitter Sensitivity

- Two Applications of Seven Identified in SIL 463 use Rosemount 1153 Transmitters
  - Reactor Water Level
  - Main Steam Line Flow

- 1153 Transmitters not Used at Pilgrim for Many Process Variables Exhibiting Problems at Other Plants

- Other Pilgrim Applications use Different Sensing Instruments With Good Performance History

- Other Pilgrim 1153 Transmitter Applications are not Noise Problems and/or do not Cause Trips

BECo Concludes Rosemount 1153 Transmitter Response Time Problems as Improbable at Pilgrim

Reactor Water Level

- **Transmitters are Slower Acting (350 to 500 millisec.)**
- **No Flexible Hose**
- **Short Instrument Tube Runs**
- **Lines Properly Routed and Supported**

BECo Concludes Rosemount 1153 Transmitter Response Time Problems are Improbable at Pilgrim

Main Steam Line

- **Large Margin Between Normal Operation (100 psid) & Trip Set Point (121 psid)**

- **Industry Noise Lower Than Margin by Factor of 10**

- **No Flex Hose; Lines are Short & Properly Supported and Sloped**

- **Industry Has Not Experienced Inadvertent Actuations From Main Steam Line Ringing**

Pilgrim is Similar to Plants Having No Inadvertent Trips Due to Fast 1153 Transmitter Response Time

- These Plants have no long Tubing Runs
- Do not use flexible Hose
- Do not use Fast Response Time Transmitters For Water Level Applications
  - Monticello
  - Hatch
  - Vermont Yankee
  - Dresden

Pilgrim Takes Conservative Measure to Monitor for Ringing Sensitivity

- Monitor All 56 Rosemount 1153 Transmitter Outputs
- Monitor With Transient Recording in EPIC
- Design Complete, Construction Scheduled for October 1988 Completion

10/14/88

- Tie-ins are Expected to be Complete in October, Work Can Continue During Plant Operation with Final Test and Turnover During Power Ascension
- Monitoring Expected to Confirm Evaluation
  - Detects Sensitivity to Noise
  - Trends Noise Information
  - Provides Root Cause Information

Monitoring the Rosemount 1153 Transmitters is Not a Safety Issue

- **The Likelyhood of an inadvertent trip at Pilgrim due to Fast Response time instruments is very low.**
- **Proper Plant Safety Responses to Situations Requiring RPS / ECCS FunctionsWill Not Be Prevented if Monitoring is Not Available.**
- **Events at Other Plants Did Not Result in Adverse Safety Consequences.**
- **Industry Experience for Plants of PNPS Design has Shown no Inadvertent Trips From Rosemount Transmitter Sensitivity**

Monitoring of Rosemount 1153 Transmitters is Not a Re-start Issue

- Design Review Concludes Low Likelyhood of Getting Inadvertent ATS Trip / Initiation Signal
- Design Weaknesses Found at Other Plants Do not Exist at Pilgrim
- Pilgrim Reactor Water Level Instruments Have Larger Time Constant Than Those Triggering Trips at Other Plants
- Pilgrim Main Steam Line Flow Transmitter Setpoints are Well Above Normal Output Providing a Large Margin
- Industry Experience for Plants of PNPS Design has Shown no Inadvertent Trips From Rosemount Transmitter Sensitivity
- Monitoring Capability is Scheduled to be Available Before Completion of Power Ascension
- Plant Response to an Inadvertent ATS Signal is within Design Basis

Other Reported Rosemount 1153 Transmitter Problems are not Restart Issues

- **Transmitter Lock-up**
  - **Caused by Metallic Filings in the Dielectric Silicon Oil**
  - **Failures are Random and Easily Detected By Daily Surveillances**
  - **Initiation Logic Requires 2 out of 2 Failures - Improbable With Daily Surveillances**

- **Transmitter Drift**
  - **Drift Caused by Oil Leaking From Diaphragm**
  - **Failures are Random and Easily Detected By Daily Surveillances**
  - **Initiation Logic Requires 2 out of 2 Failures - Improbable With Daily Surveillances**

Rosemount 1153 Transmitter 'Ringing' Safety Concerns

Q. Why are Rosemount transmitter problems not a safety concern?

A. Problems will result in premature (conservative) safety system initiation.

The following is a discussion of the three separate problems which have been identified.

TRANSMITTER RESPONSE TIME - When an underdamped system is exposed to a pulse or step transient, its output signal will overshoot the final steady state signal level and oscillate at the instrument's resonant frequency at a decaying amplitude.

ASSESSMENT OF RISKS:

- Fast response time could cause inadvertent trips / initiations of RPS and ECCS systems. This would be caused by process ringing, noise or transients in the system. This is not a safety problem, as the safety systems will have performed their safety functions; however, challenges to these systems should be avoided because of the potential to degrade system reliability. Rosemount transmitters are inherently not susceptible to ringing as they are underdamped and will not overshoot or ring. However, if the system being monitored rings in response to a process transient, a monitoring transmitter with a sufficiently fast response time will produce an output which mirrors the system ringing response.

- The Rosemount transmitters installed at PNPS for reactor water level are typically slower than that required to respond to the noise characterized by GE in SIL 463. If the noise in PNPS systems have the same characteristics as has been documented at other BWR's, the installed transmitters will not be affected and no inadvertent trips / initiations will occur.

- A large transient in the water level system could alternately initiate and trip the HPCI system. This was observed at Hope Creek during their turbine trip event but resulted in no loss of function to the HPCI system. This is attributable to the short duration of this transient (less than 3 seconds) which would prevent the system from actuating.

- Noise in the main steam line may cause premature actuation of the high flow group 1 PCIS actuation and the resulting SCRAM. The main steam line system at PNPS were designed to accommodate full flow in three of the four steam lines. Consequently, the high flow setpoints are set at approximately 25 psid higher than the normal signal level. Therefore in order for noise to trip these instruments, it must have a magnitude of approximately 25 psid. This magnitude of noise is physically unrealistic and well beyond the range of nose observed in the industry

  (Note that a high speed data acquisition system would be required to determine the nature of process noise at PNPS.)

TRANSMITTER LOCK-UP -Transmitters have failed due to metallic filings in the dielectric silicone oil. This causes the transmitter output to shift and remain offscale hi or lo and not responding to the transmitter input.

ASSESSMENT OF RISKS:

This failure mode is random in nature and easily detectable by daily surveillances which would result in the immediate replacement of the faulty transmitter. This is not a safety issue as the initiation logic requires at least two instruments to provide signals. The probability of two instruments failing in the same direction within a 24 hour surveillance period is vanishingly small and has never been observed in the industry.

TRANSMITTER DRIFT DUE TO LEAKAGE - The transmitters have silicone oil filling their diaphragms. The oil has been observed to leak from the diaphragms resulting in transmitter drift and sluggish response.

ASSESSMENT OF RISKS:

- The failure mode does not occur immediately but takes a length of operation before it is exhibited. It is easy to detect by performing daily surveillances which would result in the immediate replacement of the faulty transmitter. This is not a safety issue because the initiation logic requires at least two instruments to provide signals. The probability of two instruments exhibiting this failure mode within a 24 hour surveillance period is vanishingly small and has never been observed in the industry.

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August 31, 1988

BECo Ltr. #88-129

U. S. Nuclear Regulatory Commission
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SUBJECT: Pilgrim Nuclear Power Station Power Ascension Program (Revised)

Dear Sir:

This letter forwards a revision to the description of the Power Ascension Program and associated Boston Edison processes for assessment of performance during power ascension.

The attached Power Ascension Program revises certain elements of the prior submission forwarded by Boston Edison letter 87-163 dated October 15, 1987. The Power Ascension Program is submitted for information and review. Five NRC Approval Points are submitted for NRC review and approval.

The purpose of this revision is to add four periods of normal operation/observation during the Power Ascension Program for new operator required training, for enhancing operational proficiency and for additional self assessment. System tightness and operability under hot plant conditions will be confirmed and portions of a Special Post Startup Training Program will be conducted prior to increasing power above five percent.

The Power Ascension Program includes the same four elements as the prior version, namely, a description of the logic plan for power ascension, Boston Edison's Assessment Points, the proposed NRC Approval Points, the startup organization and the management assessment process. As the final

phase of the Restart Plan, the Power Ascension Program is the mechanism by which Boston Edison will demonstrate the effectiveness of its programs, plans and actions to assure safe and reliable restart and continued operation.

Please contact me, or R. A. Ledgett of my staff, if you have questions or need additional information concerning the PNPS Power Ascension Program.

R. G. Bird

Attachment

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BOSTON EDISON COMPANY

PILGRIM NUCLEAR POWER STATION

Power Ascension Program

September 1, 1988

POWER ASCENSION PROGRAM

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I. Introduction

This document describes the Power Ascension Program for the restart of Pilgrim Nuclear Power Station (PNPS) from the current outage (RFO-7). The Power Ascension Program is the final phase of the PNPS Restart Plan and is the mechanism by which Boston Edison will demonstrate the effectiveness of its programs, plans and actions. This program description should be read in conjunction with the Restart Plan, dated July 30, 1987 and the Readiness for Restart Self Assessment report dated May 26, 1988, to understand the scope of programs, plans and actions undertaken by Boston Edison to assure safe and reliable restart and continued operation.

The program description is organized to describe the Power Ascension Program in the following sequence:

- o Logic Plan
- o Management Assessment Points and NRC Approval Points
- o Startup Organization
- o Management Assessment Process

The management assessment description includes the mechanism for Boston Edison's process for confirming readiness for intial criticality and for oversight and assessment during power ascension. This assessment process includes close monitoring and evaluation of personnel and plant performance by Boston Edison nuclear managers, with personal observation by senior nuclear managers.

II. Power Ascension Logic Plan

Boston Edison has developed a power ascension logic plan for the testing, restart and power ascension from RFO-7. The bases for this logic plan and the sequence of power ascension steps and associated tests are described in this section. The management assessment process, including the management Assessment Points, is integrated into the logic plan.

A. Bases for Logic Plan

The power ascension logic plan is based on and complies with the PNPS Technical Specifications. In addition, the plan considers prior power ascension experience at PNPS, specific testing requirements for the work accomplished in RFO-7, personnel and equipment performance evaluation, Nuclear Regulatory Commission (NRC) Approval Points and prior relevant nuclear industry experience.

Both testing and training will be conducted primarily at four test condition power levels. Three intermediate test condition power levels are nominally within plus or minus 5% of power level at 25, 50 and 75%. The fourth test condition power level is 95 to 100%.

Power ascension experience from prior PNPS refueling outages is incorporated into the power ascension logic plan. The plan is similar to the sequence of power ascension that was proven successful in RFO-6. In addition, checklists for plant operational condition changes, which were first used to track the completion of designated RFO-6 milestones leading to restart during the recirculation pipe

replacement work, have been expanded and refined for use during the approach to criticality and during RFO-7 power ascension.

Several specific hardware performance problems led directly to the plant shutdown that resulted in RFO-7. Therefore, in the course of power ascension, special tests will be conducted to verify proper operation of that hardware under certain plant operating conditions. These special tests are to confirm:

(1) the main steam isolation valves' ability to open with normal differential pressure across them;

(2) the adequacy of the monitoring method and procedure in the event of leakage from the reactor to low pressure portions of the Residual Heat Removal System; and

(3) that main steam isolation valves remain open during reactor depressurization after the mode switch has been shifted from "Run" to "Startup".

An additional test unique to this startup is a shutdown-from-outside-the-Control Room which will be conducted after successful performance of the three special tests.

The power ascension program includes management assessment periods at each test condition power level. Each assessment period ends in an Assessment Point, during which management can systematically review earlier performance evaluation results, assure itself that corrective actions taken as a result of performance evaluations have been effective, and determine that the plant and its staff are ready to proceed with a period of normal operation/observation with the level of supervision and oversight more typical of that which will be in place during normal operations.

These normal operation and observation periods will include reactivity changes and plant evolutions as appropriate for new operator required training, for establishing proficiency and familiarity with plant characteristics during steady state operations, for additional confirmation of satisfactory equipment operation, and for self assessment of performance.

The process for conducting performance evaluations of PNPS personnel and equipment and the process for performing management assessments of the results of those performance evaluations at each Assessment Point and subsequent normal operation/observation periods, are described in Section V.

In response to the NRC request in the August 27, 1986 letter on the subject of Confirmatory Action Letter (CAL) 86-10, Boston Edison proposes five NRC Approval Points, each of which require oral approval from NRC Region I for continuation of the power ascension. These Approval Points are described in Section III.

Finally, Boston Edison has continued to consider prior relevant nuclear industry experience with restart and power ascension programs. Boston Edison also has considered the specific plant circumstances under which other restart and power ascension programs were developed and conducted, to distinguish those features in other plants' programs which should apply to PNPS restart from those features which were plant-specific and should not apply.

B. Summary Description of Power Ascension

A sequence of power ascension steps and associated tests brings the plant from approach-to-criticality to 100% power. This sequence is depicted in Figures 1 and 2. Figure 1 is a diagram of the testing, training, assessment and power ascension steps.

A portable auxiliary boiler has been successfully used to perform HPCI and RCIC testing at 150 psig. HPCI and RCIC overspeed tests satisfactorily completed using the auxiliary boiler have been deleted from the initial power ascension sequence depicted in Figure 1. Figure 2 is a plot of approximate power levels during the specified tests, assessments, operator proficiency periods and training.

As illustrated in Figure 1, the PNPS reactor will be taken critical following Boston Edison and NRC approval of restart. As the plant is slowly heated and pressure is increasing, a number of routine startup tests and checks of plant equipment and special operator training will be conducted. Some of these tests, instrument calibrations, and checks are indicated in Figure 1.

During initial reactor heatup, the main steam isolation valves will be tested to verify that they open with normal differential pressure across the valves. This test is designed to verify correction of one of the plant hardware problems addressed in CAL 86-10.

Beginning with initial reactor heatup and continuing throughout the power ascension, Boston Edison will monitor the low pressure portions of the Residual Heat Removal system for in-leakage from the reactor. This action addresses a second hardware problem from CAL 86-10.

The reactor will be operated below 5% for plant system tightness and system operability verification under hot plant conditions and for portions of the Special Post Startup Training Program prior to requesting NRC approval to proceed to the next higher power test condition for programmed testing.

At approximately 25% reactor power, Boston Edison will initiate a normal shutdown, shift the mode switch to "Startup" and decrease reactor pressure to about 800 psig to confirm that the main steam isolation valves remain open during reactor depressurization after the mode switch is shifted from "Run" to "Startup". This test addresses the third problem addressed in CAL 86-10.

Following successful completion of testing and after Management Assessment Point 1, Boston Edison will conduct approximately thirty days of normal operation for observation, for new operator required training, for establishing proficiency and familiarity with plant characteristics during normal plant operations, and for additional self assessment.

After completion of the normal operation/observation period, followed by NRC approval to raise power level above the 25% power test condition, the required shutdown-from-outside-the Control Room-test will be conducted.

Following recovery from the shutdown test, the scram setpoint will be raised to the 70% power level and reactor power will be gradually increased to approximately 50% as normal testing and calibration are conducted. Boston Edison management will again assess performance of the plant and personnel at this point, followed by a second normal

operation/observation period for new operator required training, for enhancing operator proficiency and familiarity with plant characteristics, and for self assessment.

Following NRC approval to go above the 50% power test condition, the scram setpoint will be raised to the 95% power level to permit the reactor to be brought to approximately 75% power. During this time, reactor engineering tests comparable to those performed at the 50% power test condition, as well as turbine valve tests and main steam isolation valve tests, will be conducted. Boston Edison management will assess the performance of the plant and personnel at this point, followed by a third normal operation/observation period for new operator required training, for enhancing proficiency, and familiarity with plant characteristics and for self assessment, before permitting the power ascension to continue. Upon satisfactory completion of testing at the 75% power test condition, and when management confirms that operator training requirements have been met satisfactorily, operating crews may make the transition from a four to a six section watch rotation.

Following NRC approval to go above the 75% power test condition, the scram setpoint will be raised to its normal 120% level and the reactor will be brought to approximately 100% power. Routine reactor engineering tests will be conducted at this power level to complete the power ascension process. Boston Edison management will assess the performance of the plant and personnel, confirming satisfactory completion of the Power Ascension Program and the effectiveness of the

programs, plans and actions for continued operation. This assessment will be followed by the fourth period of normal operation/observation.

This sequence of restart tests for startup from RFO-7 is documented in PNPS Nuclear Operations Department Temporary Procedure 87-114. Major elements of the procedure are the summary description, the cross-reference of the tests, and the Restart Program Checklist. The summary description of the tests is intended for general information. The specific details or criteria for actually conducting the listed tests will be incorporated in the individual PNPS operating procedures which are referenced in Temporary Procedure 87-114. The Restart Program Checklist will be used to document acceptable completion of tests.

Figure 1, the Power Ascension Plan, will be used by the Startup Test Manager to develop the daily testing and power ascension schedules. The daily testing and power ascension schedules will be approved by the Operations Section Manager. The power ascension testing will be coordinated with the Master Surveillance Tracking Program using the Plan of the Day. The Plan of the Day is approved by the Plant Manager.

The startup test organization will function fully during the testing periods associated with each of the power level test conditions, and will be on standby during the normal operation/observation periods for operator training, self assessment and equipment observation, but will remain on-call to function as needed.

III. Management Assessment Points and NRC Approval Points

Boston Edison will assess personnel and equipment performance at several points during the power ascension. The process for assessment prior to initial criticality and resulting actions will have been completed prior to requesting restart and is discussed in Section V.A. The sources of Boston Edison Assessment Point and NRC Approval Point requirements, the actual Assessment Points, and the proposed Approval Points for power ascension are described in this section.

A. Sources of Assessment Point and Approval Point Requirements

In the course of its self assessment, Boston Edison's senior nuclear management has identified a need for a number of predetermined Assessment Points for review of personnel and equipment operational performance. These Assessment Points occur at logical intervals in the power ascension sequence. Senior management approval will be obtained before power ascension will be permitted to continue beyond each Boston Edison management Assessment Point.

The NRC, in its August 27, 1986 letter, requested that the PNPS Power Ascension Program include "hold points at appropriate stages such as criticality, completion of mode switch testing, and at specific milestones during ascension to full power." In response to this request, Boston Edison proposes five NRC Approval Points which would require oral authorization from NRC Region I before PNPS can continue power ascension.

B. Description of Power Ascension Assessment Points

Four Boston Edison Assessment Points are planned during the Power Ascension Program. The purpose of these Assessment Points is to confirm readiness to proceed with normal operation/observation periods for operator training and self assessment and the next period of power ascension. The first assessment point using the process described in Section V will occur at the 25% power test condition. Examples of the types of activities that will be conducted during each of the assessment periods are described. At each Assessment Point, management will review results of observations, performance evaluations, and any corrective actions taken for personnel, equipment and procedures during the preceding period of power ascension. Further, management will identify additional corrective actions as required.

Assessment Point 1

The first Assessment Point will be after recovery from testing to confirm that the main steam isolation valves remain open during reactor depressurization after the reactor mode switch is shifted from "Run" to "Startup", and prior to a period of normal operation/observation for operator training, proficiency and self assessment. Assessment Point 1 appears in Figure 1.

During the period between initial criticality and Assessment Point 1, operational training, personnel and equipment performance will be

evaluated. The types of activities and tests that will be undertaken during this period include the following:

- Reactor vessel heat-up, and the bringing of equipment on line to support increased power, including the conduct of operations, maintenance, technical and radiological control duties;
- System tightness and operability tests under hot plant conditions;
- HPCI and RCIC testing at 150 psig requiring coordination of activities by the operations, maintenance and radiological controls personnel;
- Operator in sequence criticals;
- Reactor water level instrumentation checks; and
- SRM/IRM overlap checks.

Evaluations of activities such as those described above will enable management to assess the performance of personnel in a variety of disciplines, as well as the working interface and coordination between the disciplines.

Management will conduct this formal assessment and determine readiness to proceed with operator training, establishing proficiency and additional self assessment with power level at the 25% power test condition. This range was selected for calibration of the nuclear instrumentation. The "Management Assessment" period of 8 to 12 days is depicted in Figure 1 and in Figure 2. Subsequent to this assessment period, newly licensed Reactor Operators (individuals receiving licenses after May 1987) on each operating crew are scheduled to receive approximately thirty days of normal operation/observation to gain operating experience to satisfy new license requirements and enhance their proficiency. This operating

experience will include reactivity changes for training and other planned evolutions such as equipment startup and shutdown.

Assessment Point 2

The second Assessment Point will be after the reactor engineering tests at the 50% power test condition prior to a period of normal operation/observation for operator training, proficiency enhancement and additional self assessment, and moving the scram setpoint above the 70% power level. Assessment Point 2 appears in Figure 1.

Between Assessment Points 1 and 2, a number of tests and plant activities, such as bringing equipment on line to support increasing power, will provide an opportunity for evaluation of equipment and personnel performance. The types of activities and tests that will be undertaken during this period include the following:

- Shutdown-from-outside-the Control Room test, requiring shutdown of the reactor from the dedicated Alternate Shutdown Panels in the Process Buildings while maintaining a qualified crew of operators in the Control Room.

- Assessment of plant operation between 25% and 50% power which will place the plant in an increasingly stable configuration by virtue of the following conditions:

  (1) Condensate system will be fully in service;

  (2) Both feedwater regulator valves will be in automatic;

  (3) RPV level control will be in three element control;

  (4) Power level will still be within bypass valve capability between 25% and 30% power levels;

  (5) 4Kv busses will be transferred to the unit auxiliary transformer with the startup transformer as backup;

  (6) APRM's will be on scale providing total core coverage;

(7) Power level will be high enough for a heat balance;

(8) Drywell will be inerted and differential pressures established;

(9) Electrical pressure regulator will be in service providing tighter automatic pressure control with the mechanical pressure regulator in backup; and

(10) Chemistry controls in place will be much tighter than during startup.

The "Management Assessment" period immediately prior to Assessment Point 2 is shown in Figure 1 and in Figure 2. The duration of this assessment period will be adjusted based on performance observed. Similarly the duration of the following period of normal operation/observation for operator training, proficiency enhancement and additional self assessment will be determined during the "Management Assessment" and will be adjusted based on the results of self assessment during the training period.

Assessment Point 3

Boston Edison has selected a third Assessment Point after completion of the reactor engineering tests at the 75% power test condition prior to the third period of normal operation/observation for operator training, proficiency enhancement and additional self assessment and movement of the scram setpoint above 95% power. Assessment Point 3 is depicted in Figure 1.

Many of the plant activities between Assessment Points 2 and 3 are virtually identical to those between Points 1 and 2 because the reactor engineering tests conducted at the 75% power test condition are largely a repetition of those conducted at the 50% power test condition. During this period, additional plant equipment will be placed in service as necessary to support the higher power levels. The types of activities that will be conducted during this period include the following:

- Placing the additional condensate demineralizer units in service;
- Operation of the Augmented Offgas System;
- Placing the third reactor feedwater pump in service;
- Routine surveillances and preventive maintenance, chemistry analyses and radiological surveys; and
- Condenser thermal backwash.

The "Management Assessment" period immediately prior to Assessment Point 3 is depicted in Figure 1 and in Figure 2. The duration of this

assessment period will be adjusted based on performance observed.

Training requirements for new operators are planned to be completed by this time. A period of normal operation/observation at around 75% power will follow Assessment Point 3. The purpose of this period is to gain operator experience and proficiency with the plant in its full power configuration and for additional self assessment. When operator training requirements are confirmed to have been met, and with management concurrence, this period may also be used to make the transition from a four to a six section operator watch rotation. The duration of this period will be determined during the "Management Assessment" and will be adjusted based on the results of self assessment during the training period.

Assessment Point 4

At nominal 100% power, the final series of reactor engineering tests and calibrations in the Power Ascension Program will be performed. Evaluation conducted between Assessment Points 3 and 4 will largely focus on routine operating activities such as coordination of surveillances, anticipation and correction of problems, and the conduct of routine and preventive maintenance. In addition, operating activities such as recirculation flow adjustments and control rod manipulations to counteract xenon buildup and achieve 100% power provide an opportunity to evaluate the coordination between operations personnel and reactor engineers.

Results from these reactor engineering tests, as well as the additional performance evaluations, will be assessed by Boston Edison senior management at the fourth Assessment Point, which will be followed by the fourth period of normal operation/observation for additional self assessment. Boston Edison management will assess the performance of the plant and personnel, confirming satisfactory completion of the Power Ascension Program and the effectiveness of the programs, plans and actions for continued operation. The results of this final assessment will be formally provided to the NRC to support close-out of Confirmatory Action Letter 86-10.

C. Description of Approval Points

As shown in Figure 2, Boston Edison proposes five NRC Approval Points.

In accordance with CAL 86-10, dated April 12, 1986, the first NRC Approval Point is immediately prior to criticality.

The second NRC Approval Point is proposed where the plant has been brought to criticality and is being held to power levels below 5% in order to conduct testing, conduct portions of the Special Post Restart Training Program, and verify plant system tightness and operability under hot plant conditions.

NRC Approval Points two through five will be preceded by a recommendation from PNPS line management, with the concurrence of the oversight and assessment team, that it is ready for the NRC to consider approval of continuation of power ascension to the next programmed test condition.

The third NRC Approval Point is proposed after recovery from testing to verify that the main steam isolation valves remain open during reactor depressurization after the reactor mode switch is shifted from "Run" to "Startup," after the normal operation/observation period for training and proficiency enhancement and prior to commencement of the shutdown-from-outside-the-Control Room test. NRC letter dated August 27, 1986 on the subject of Confirmatory Action Letter 86-10 suggested one NRC Approval Point after mode switch testing. The third NRC Approval Point is proposed

to also include the opportunity to observe the subsequent normal operation/observation period before granting approval.

The fourth NRC Approval Point is proposed after completion of reactor engineering tests, the normal operation/observation period for operator training and proficiency enhancement at the 50% power test condition and before the scram setpoint is adjusted above the 70% level.

The fifth NRC Approval Point prior to full power operation is proposed after completion of the reactor engineering tests and the normal operation/observation period for operator training and proficiency enhancement at the 75% power test condition and prior to movement of the scram setpoint above the 95% level. At this point, results from the reactor engineering tests and operator training can be reviewed to confirm readiness to complete power ascension.

At 100% power after completion of engineering tests and calibrations and concurrent with normal operations/observation Boston Edison management will assess the performance of the plant and personnel, confirming satisfactory completion of the Power Ascension Program and the effectiveness of the programs, plans and actions for continued operation. The results of this final assessment will be formally provided to the NRC to support close-out of Confirmatory Action Letter 86-10.

IV. Startup Organization

The PNPS startup organization for return to operation from RFO-7 is comprised of four elements as follows:

(1) the Operations Section;

(2) the post-refueling/modification outage test organization;

(3) the Nuclear Organization support for operations; and

(4) the oversight and assessment team.

The first three elements are the normal line organizations that would support restart from any complex and extended PNPS outage. The fourth element is Boston Edison's management oversight processes to increase observation and evaluation of major evolutions during power ascension, to conduct periodic management assessments of evaluations performed throughout this period, and to confirm readiness to proceed.

A. Operations Section

The Operations Section is the normal line organization for restart from an outage such as RFO-7. Plant startup from any protracted and complex outage requires that additional people be available on shift to properly execute both the routine and outage-specific tests, as well as to respond to operational problems that may occur after a long shutdown. In recognition of these factors, Boston Edison has elected to utilize a four-shift rotation for the operators. The four-shift rotation will enable assignment of the necessary number of operators, without incurring excessive and unscheduled overtime. The four-shift

rotation will also enable assignment of an experienced SRO, designated as the "Assistant Watch Engineer" to provide field oversight and on-the-job training for the equipment operators.

The actual operating organization as depicted in Figure 3 consists of the Operations Section Manager and, in descending order, his Chief Operating Engineer, the Watch Engineers for each shift, and the shift operating crews. They report to the Plant Manager.

At the completion of Assessment Point 3 and when a sufficient number of Reactor Operators are fully qualified, a transition to a six section watchbill may be implemented. This six section watchbill is intended to provide a nominal 40 hour work week for each operating crew and address watchstanding, training and extended absence coverage.

B. Post-Refueling/Modification Outage Test Organization

Boston Edison is following its normal practice to use a post-refueling/modification outage test organization for restart from a complex outage. The shaded boxes on the chart in Figure 3 show this organization. Boston Edison's experience is that this test organization's support to the Operations Section has contributed to the successful control of startup from an extended and complex outage. The Technical Section Manager is the Startup Test Manager during restart and power ascension. As such, he is responsible for directing and coordinating the efforts of the Shift Test Coordinators, Reactor Engineers, Computer Engineers, Test Engineers and Turbine Test

Engineers, for preparation of daily power ascension test schedules, and for independent review of test results.

The test organization will be fully functional during the periods of testing, and will be in a standby but on-call status during post Assessment Point normal operation/observation and training periods.

C. Nuclear Organization Support for Operations

The restart from RFO-7 will be achieved with the normal plant support functions, e.g., Nuclear Engineering, Quality Assurance/Quality Control, Security, Fire Protection, Radiological Protection, Planning/Scheduling, Technical Support and other nuclear organization functions. Due to the complexity of this outage, there will be a Shift Maintenance Representative, as shown on Figure 3, assigned to provide 24 hour coverage for maintenance coordination.

D. Oversight and Assessment Team

During restart and power ascension from RFO-7, an additional organization will provide oversight of power ascension. A description of the oversight and assessment team is provided in Section V.B.

V. Management Assessment Process

The management assessment process during restart and power ascension will focus on management, operational, plant and equipment performance. Senior Boston Edison Nuclear Organization managers will personally observe major evolutions during restart and power ascension and will assess personnel and equipment performance at each of the four designated Assessment Points to confirm readiness for continued operations. The team will also oversee PNPS line management functions during post Assessment Point periods of normal operation/observation.

As used in this program, the following terms are defined:

evaluation — processes used by peer evaluators, line management and individual members of the oversight and assessment team throughout the Power Ascension Program to observe specific activities and evaluate the performance.

assessment — processes used by the line management or oversight and assessment team during the designated assessment periods prior to each Assessment Point to review the results of prior PNPS activities, including prior performance evaluations, and to decide whether the personnel and plant are ready for continued operation.

A. Readiness Assessment for Initial Criticality

The RRSA has been completed. Based upon the status of actions arising from this assessment, senior management will decide when to recommend restart to the Boston Edison Board of Directors. Finally, after Board of Directors approval, Boston Edison will submit a request for restart to the NRC.

B. Oversight and Assessment of Power Ascension

Seven senior level managers in the Nuclear Organization will serve as the oversight and assessment team during power ascension. These senior managers will observe personnel and equipment performance during the Power Ascension Program and will perform assessments at each of the Assessment Points to confirm readiness for continued operations. The team members are:

(1) the Senior Vice President-Nuclear;

(2) the Vice President-Nuclear Engineering;

(3) the Director, Special Projects;

(4) the Nuclear Engineering Manager;

(5) the Quality Assurance Manager;

(6) the Station Director; and

(7) the Special Assistant to the Senior Vice President-Nuclear.

Direct support to the oversight and assessment team in performing assessments of plant and personnel performance will be provided by peer evaluators. In the area of operations, for example, individuals assigned as peer evaluators have current or previous BWR Senior Reactor Operator licenses or certifications. These individuals will be assigned to shift rotation to act as operations observers, team leaders for other peer evaluators assigned to that shift, and report the results of their observations and evaluations to the line organization and to the oversight and assessment team.

Other peer evaluators will be assigned to support observations in areas such as radiological controls (health physics), chemistry, technical support, security, fire protection and maintenance to support the oversight and assessment team as necessary. These peer evaluators will observe specific plant evolutions or support activities of interest and report the results of their observations and evaluations to the line management through the peer evaluator team leader, and to the oversight and assessment team. This performance evaluation process is designed to retain the flexibility to respond to changing conditions. The number and experience of the peer evaluators will be adjusted by the oversight and assessment team based on the evolution to be observed and the trend in observations.

Senior management assessment during the Power Ascension Program, and evaluation of plant and operator activities by peer evaluators will be comprehensive during the assessment periods preceding defined Assessment Points during power level test conditions. Senior management assessment and evaluation during the normal operations/observation periods for new operator required training, operator proficiency enhancement and additional self assessment subsequent to each of the formal Assessment Points will continue, but will be done on an audit basis to confirm the validity of conclusions drawn during the more intense testing and assessment periods, and will provide a unique opportunity for observing line management and crew performance in an environment more typical of normal operating conditions.

C. Performance Assessments at Assessment Points

The process for performance assessment by the oversight and assessment team at each of the four Assessment Points during power ascension will consist of the following five elements:

(1) performance standards to guide the evaluations;

(2) guidelines for follow-up and feedback of lessons learned;

(3) training on the standards and guidelines for follow-up and feedback;

(4) performance evaluations and assessments by line management; and

(5) performance evaluations by the oversight and assessment team including peer evaluations.

Performance standards have been developed for each of the disciplines that will be evaluated. These standards will be used by the evaluators as a basis for comparison of actual performance to predetermined goals to ensure consistency throughout the evaluation and assessment process. Guidelines for follow-up and feedback of lessons learned have been developed, and these cover the criteria for determining the immediacy of feedback as well as the lines of communication for feedback.

The standards developed address the following types of concerns:

(1) Is plant equipment operating safely and reliably?

(2) Are assessment and feedback of lessons learned effective?

(3) Is the organization functioning as a team?

(4) Is management oversight effective and is management knowledgeable about current plant and organizational conditions?

(5) Are problems identified, addressed and resolved in a timely and appropriate manner?

(6) Has the staff provided proper oversight of operations activities to ensure safe and reliable operation?

(7) Do the operators receive adequate and timely technical support?

(8) Is the interface between the maintenance, radiological controls, and operations personnel working properly to ensure adequate maintenance support for plant evolutions?

(9) Have the management tools such as procedures, computer programs, etc., provided the guidance and information necessary to support plant evolutions?

(10) Are off-normal conditions anticipated, recognized and resolved in a timely and appropriate manner?

These standards and guidelines, as well as the results of the evaluations, will be available at the PNPS site.

The pre-restart training of the peer evaluators involved in this evaluation and assessment process included a combination of selected activities that are dependent upon the individual's assignment/area of expertise. These activities included the following:

- Formal Classroom Instruction
- Simulator Familiarization/Lab Exercises
- On-site Field Activities (e.g., Surveillance Testing, Equipment Maintenance/Testing, System Walkthroughs, etc.)

This training and critique process has familiarized these individuals with the applicable standards and guidelines to assure a consistent basis for the evaluations. The specific plant evaluations generated during this training program, provided Boston Edison senior

management with an additional mechanism for assessing the readiness of plant personnel for initial criticality and power ascension. During power ascension, any new individuals assigned to this evaluation process will also receive training on these standards and guidelines.

Performance evaluations during restart and power ascension will be conducted on two parallel tracks. Line management will evaluate performance as part of their normal management functions, including use of the PNPS Management Monitoring Program. The oversight and assessment team will perform independent evaluations with input from peer evaluators and monitor line management functions.

During the assessment period immediately prior to each Assessment Point, the oversight and assessment team will review the results of the evaluations performed thus far. These assessments are designed to confirm satisfactory personnel and equipment performance to that point in the Power Ascension Program and the readiness of the personnel and plant for continued safe and reliable operation.

D. Assessment During Normal Operation/Observation Periods

During the post Assessment Point periods of normal operation/observation, station line management will continue operation and assess station and personnel performance, directing corrective actions as necessary, and carrying out other normal line management functions typical of a normal operating environment. The oversight and assessment team will continue to monitor line management and station performance during these periods, but at a frequency more typical of a normal operating environment.

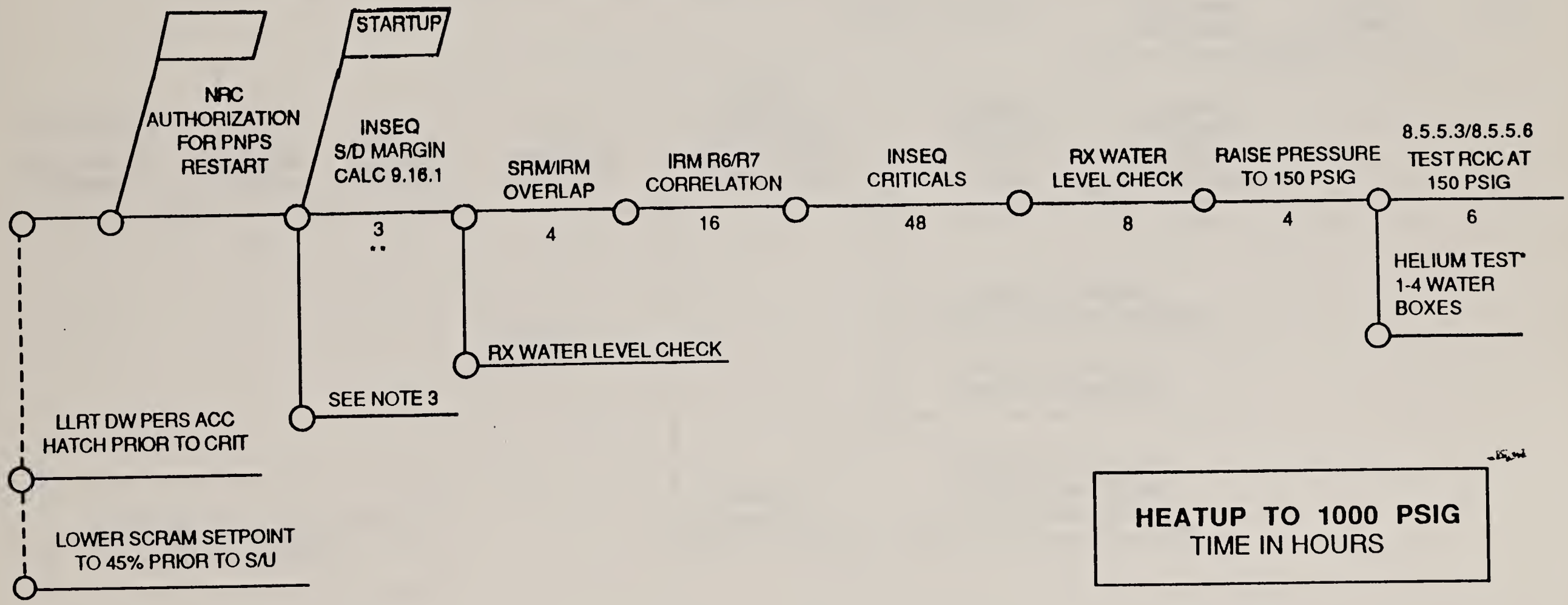
The Boston Edison recommendation to proceed with the next stage of power ascension (a prerequisite for NRC approval at each of the proposed NRC Approval Points), will be made by line management and will be monitored and concurred with by the oversight and assessment team.

GLOSSARY OF ACRONYMS

ADS	AUTOMATIC DEPRESSURIZATION SYSTEM
ASP	ALTERNATE SHUTDOWN PANEL
ACC	ACCESS
AWE	ASSISTANT WATCH ENGINEER
APRM	AVERAGE POWER RANGE MONITOR
CAL	CALIBRATION
CALC	CALCULATION
CHAMB	CHAMBER
CIV	COMBINED/INTERCEPT VALVE
COMP	COMPUTER
CRD	CONTROL ROD DRIVE
CRIT	CRITICALITY
CS	CORE SPRAY SYSTEM
CTP	CORE THERMAL POWER
DET	DETECTION
DW	DRYWELL
ENG	ENGINEERING
EPIC	EMERGENCY AND PLANT INFORMATION COMPUTER
EPR	ELECTRIC PRESSURE REGULATOR
FUNCT	FUNCTIONAL
FW	FEEDWATER
GEN	GENERATOR
HPCI	HIGH PRESSURE COOLANT INJECTION
INSEQ	INSEQUENCE
IRM	INTERMEDIATE RANGE MONITOR
LLRT	LOCAL LEAK RATE TEST
LPCI	LOW PRESSURE COOLANT INJECTION
LPRM	LOCAL POWER RANGE MONITOR
LSTG	LARGE STEAM TURBINE GENERATOR
MGMT	MANAGEMENT
MSIV	MAIN STEAM ISOLATION VALVE
NRC	NUCLEAR REGULATORY COMMISSION
O/S	OVERSPEED
OD	ON DEMAND
OPER	OPERATING PROCEDURE
PCIOMR	PRECONDITIONING INTERIM OPERATING MANAGEMENT RECOMMENDATION
PERS	PERSONNEL
PNPS	PILGRIM NUCLEAR POWER STATION
RCIC	REACTOR CORE ISOLATION COOLING
REG	REGULATOR
RM	ROOM
RRSA	RESTART READINESS SELF ASSESSMENT
Rx	REACTOR

S/D	SHUTDOWN
S/U	STARTUP
SDOCR	SHUTDOWN OUTSIDE CONTROL ROOM
SJAE	STEAM JET AIR EJECTOR
SRM	STARTUP RANGE MONITOR
STM	STEAM
SV	STOP VALVE
TP	TEMPORARY PROCEDURE
TEMP	TEMPERATURE
TIP	TRAVERSING INCORE PROBE
TSI	TURBINE SUPERVISORY INSTRUMENTATION
TURB	TURBINE

POWER ASCENSION PLAN



NOTE:

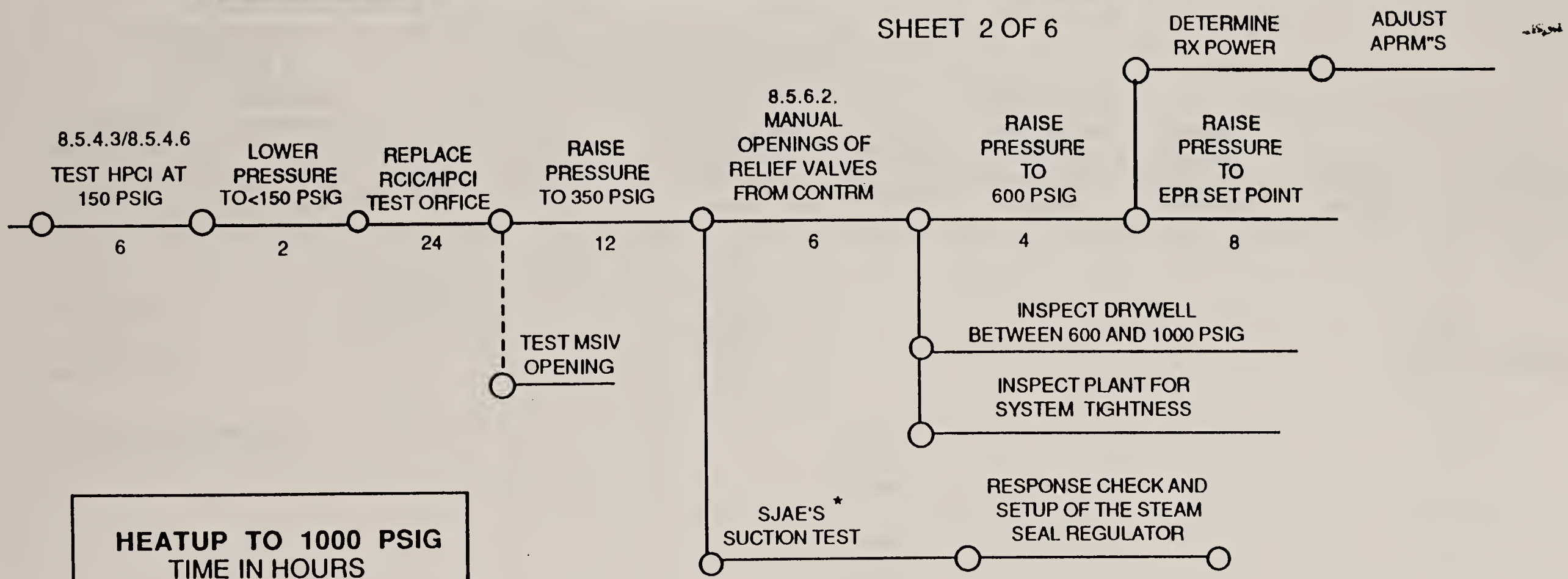
1. HPCI & RCIC TESTING SATISFACTORILY COMPLETED WITH AUXILIARY BOILER MAY BE DELETED.
2. THIS IS A PLAN FROM WHICH DAILY SCHEDULES WILL BE DEVELOPED. THESE DAILY SCHEDULES WILL TAKE INTO CONSIDERATION PLANT AND EQUIPMENT STATUS.
3. MONITOR RHR PRESSURE IN-SYSTEM LEAKAGE FROM PRESSURATION THROUGHOUT POWER ASCENSION

* NOT A MANDATED TEST

** THIS MAY NOT BE PERFORMED IF SHUTDOWN MARGIN HAS PREVIOUSLY BEEN DEMONSTRATED

Figure 1

POWER ASCENSION PLAN



HEATUP TO 1000 PSIG
TIME IN HOURS

NOTE:

1. HPCI & RCIC TESTING SATISFACTORILY COMPLETED WITH AUXILIARY BOILER MAY BE DELETED.
2. THIS IS A PLAN FROM WHICH DAILY SCHEDULES WILL BE DEVELOPED. THESE DAILY SCHEDULES WILL TAKE INTO CONSIDERATION PLANT AND EQUIPMENT STATUS.
3. MONITOR RHR PRESSURE IN-SYSTEM LEAKAGE FROM PRESSURATION THROUGHOUT POWER ASCENSION

* NOT A MANDATED TEST

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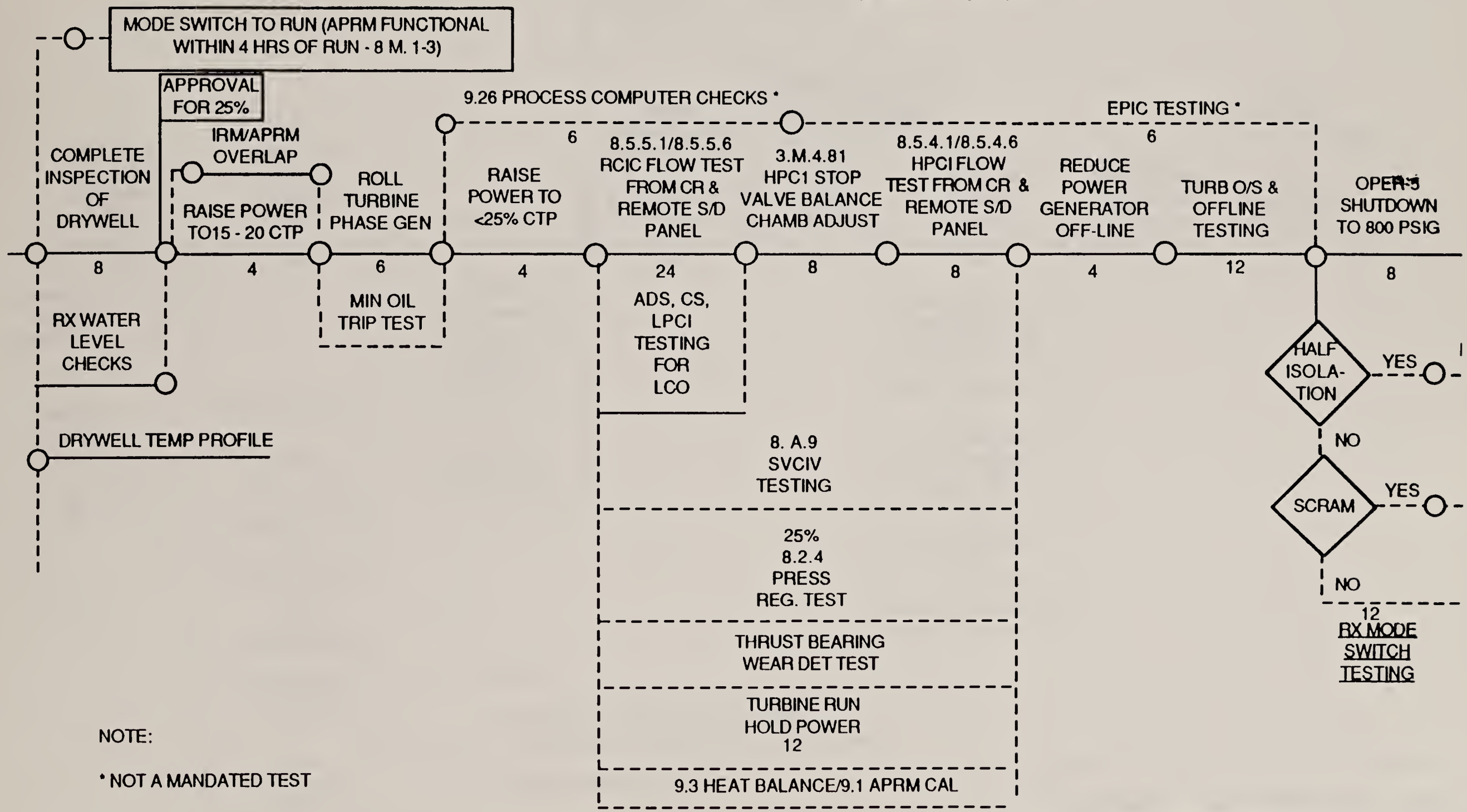
Figure 1

POWER ASCENSION PLAN

SHEET 3 OF 6



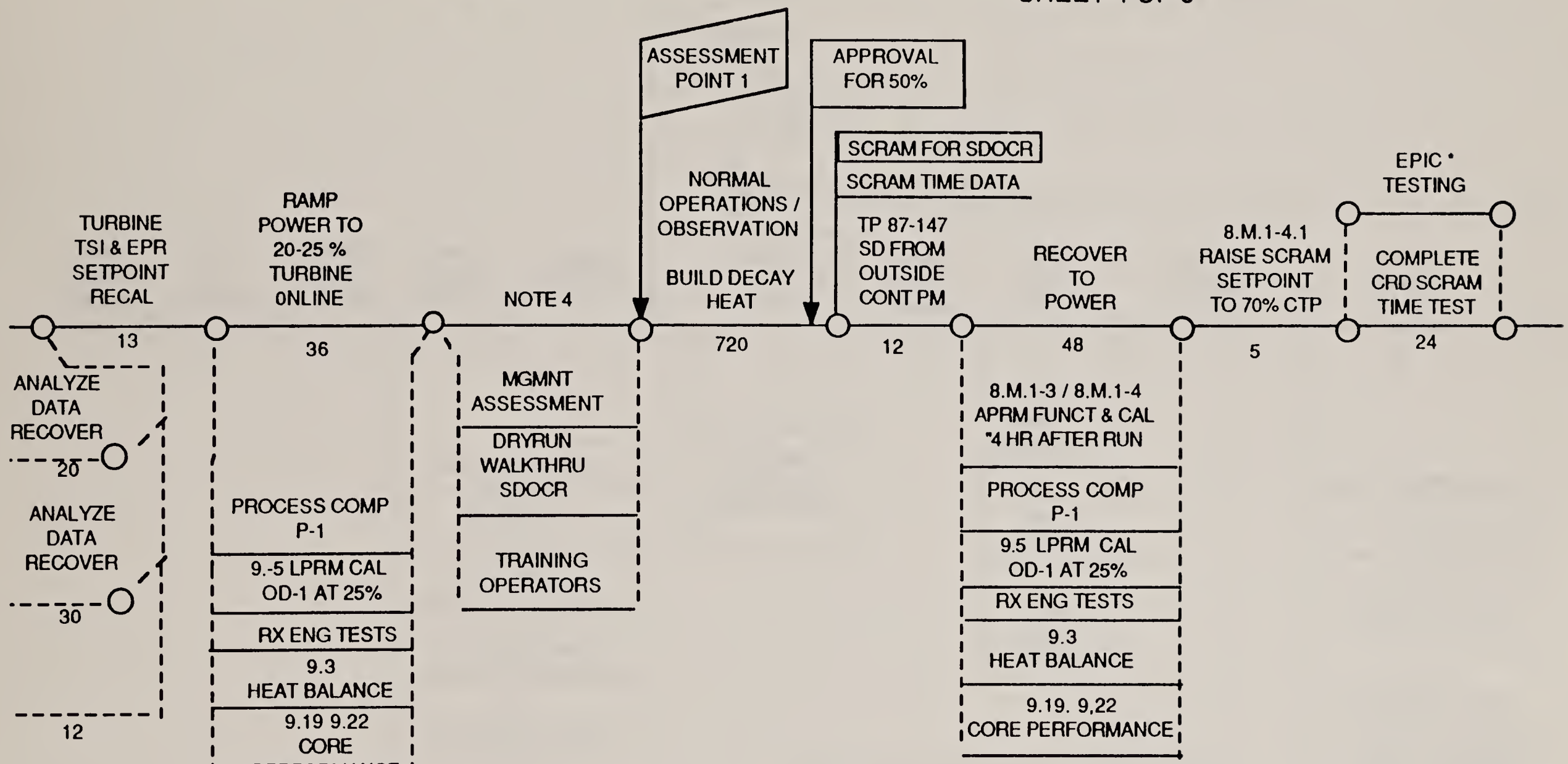
NOTE:

* NOT A MANDATED TEST

TESTING - 1000 PSIG TO 25%
TIME IN HOURS

Figure 1

POWER ASCENSION PLAN



NOTE:

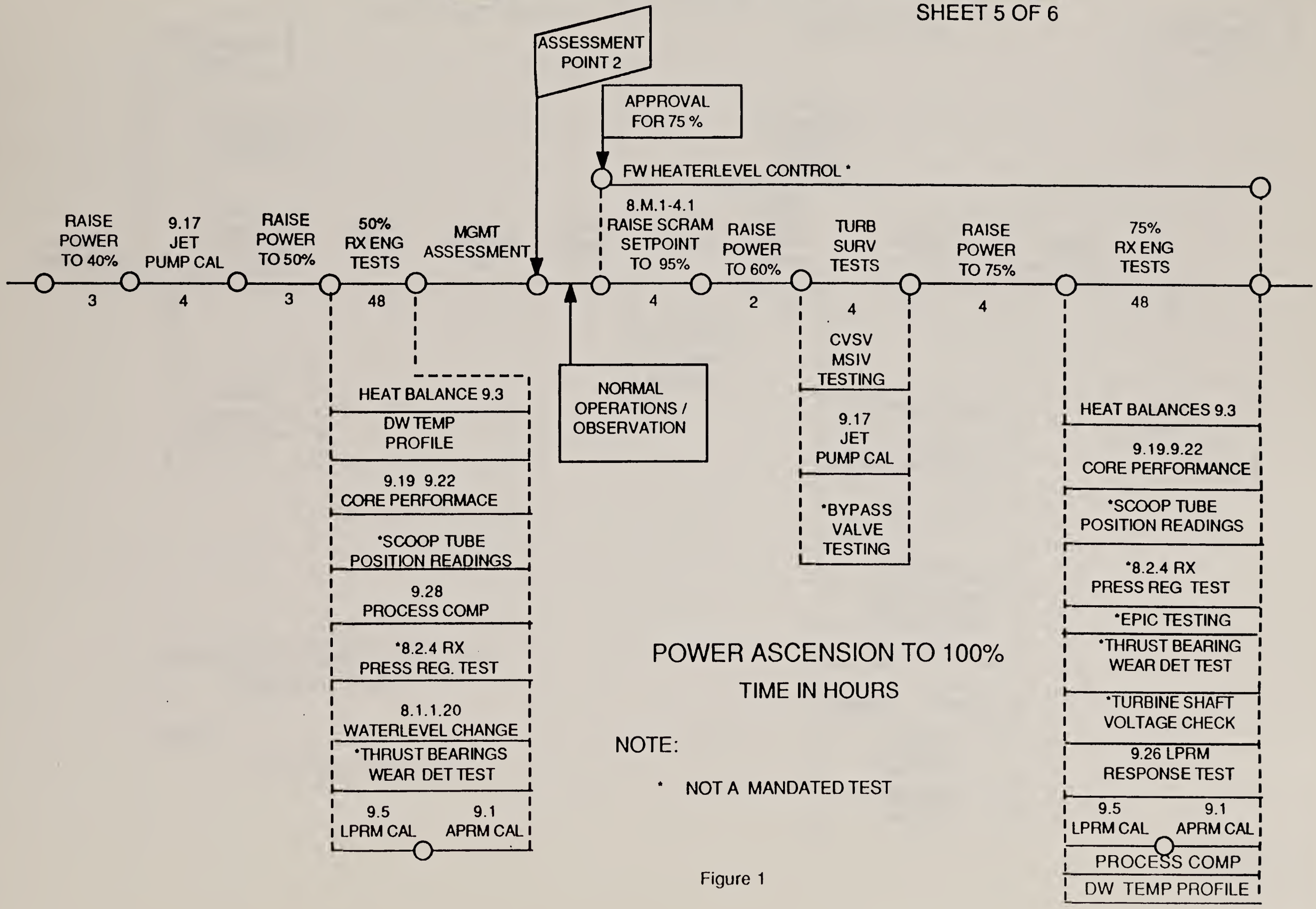
4. FIVE FULL SHIFTS OF OPERATION FOR EACH OF THE FOUR WATCH SECTIONS

* NOT A MANDATED TEST

TESTING - 1000 PSIG TO 25%
TIME IN HOURS

Figure 1

POWER ASCENSION PLAN



POWER ASCENSION TO 100%

TIME IN HOURS

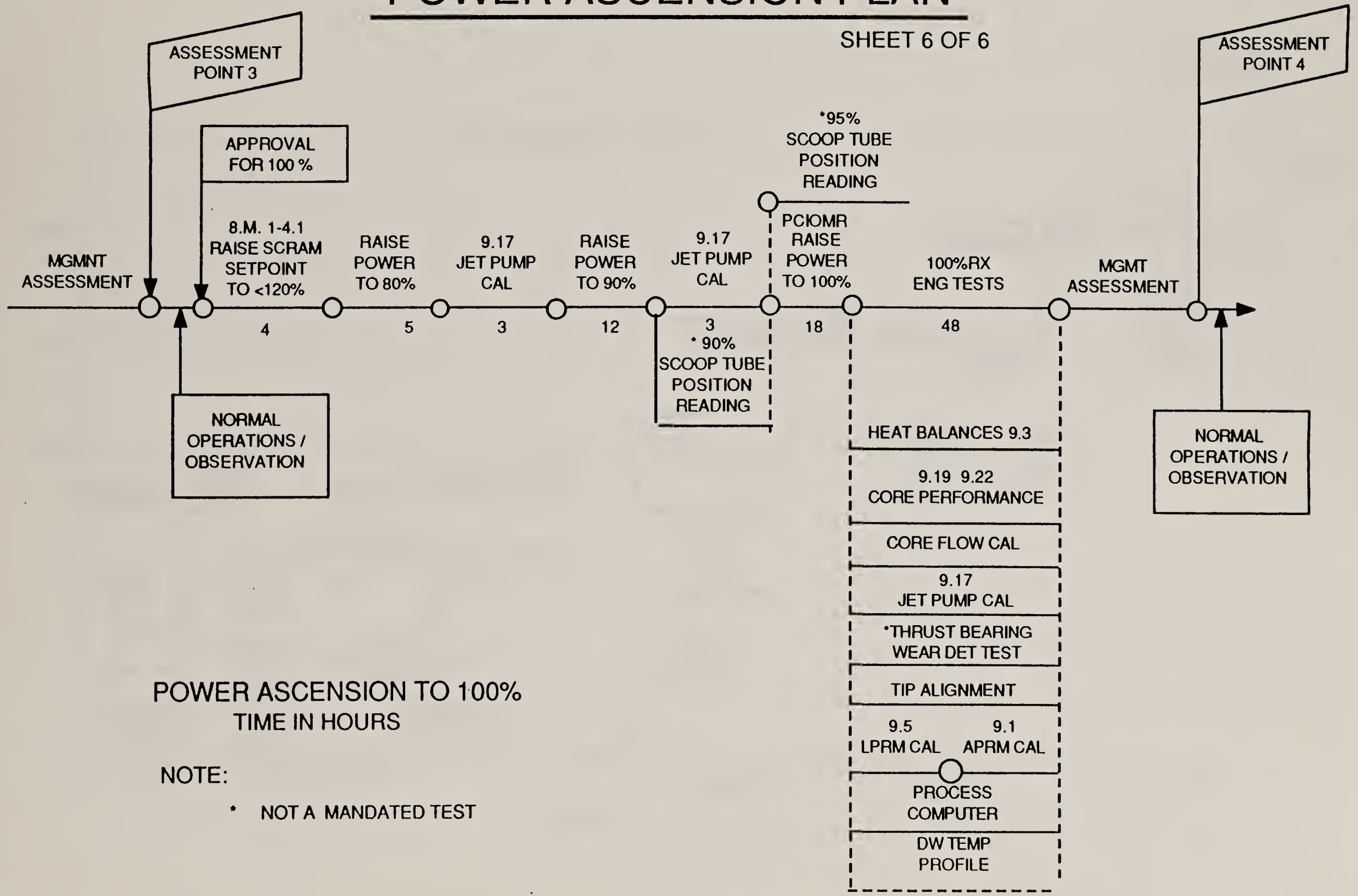
NOTE:

* NOT A MANDATED TEST

Figure 1

POWER ASCENSION PLAN

SHEET 6 OF 6



POWER ASCENSION TO 100%
TIME IN HOURS

NOTE:

* NOT A MANDATED TEST

Figure 1

POWER ASCENSION PLAN

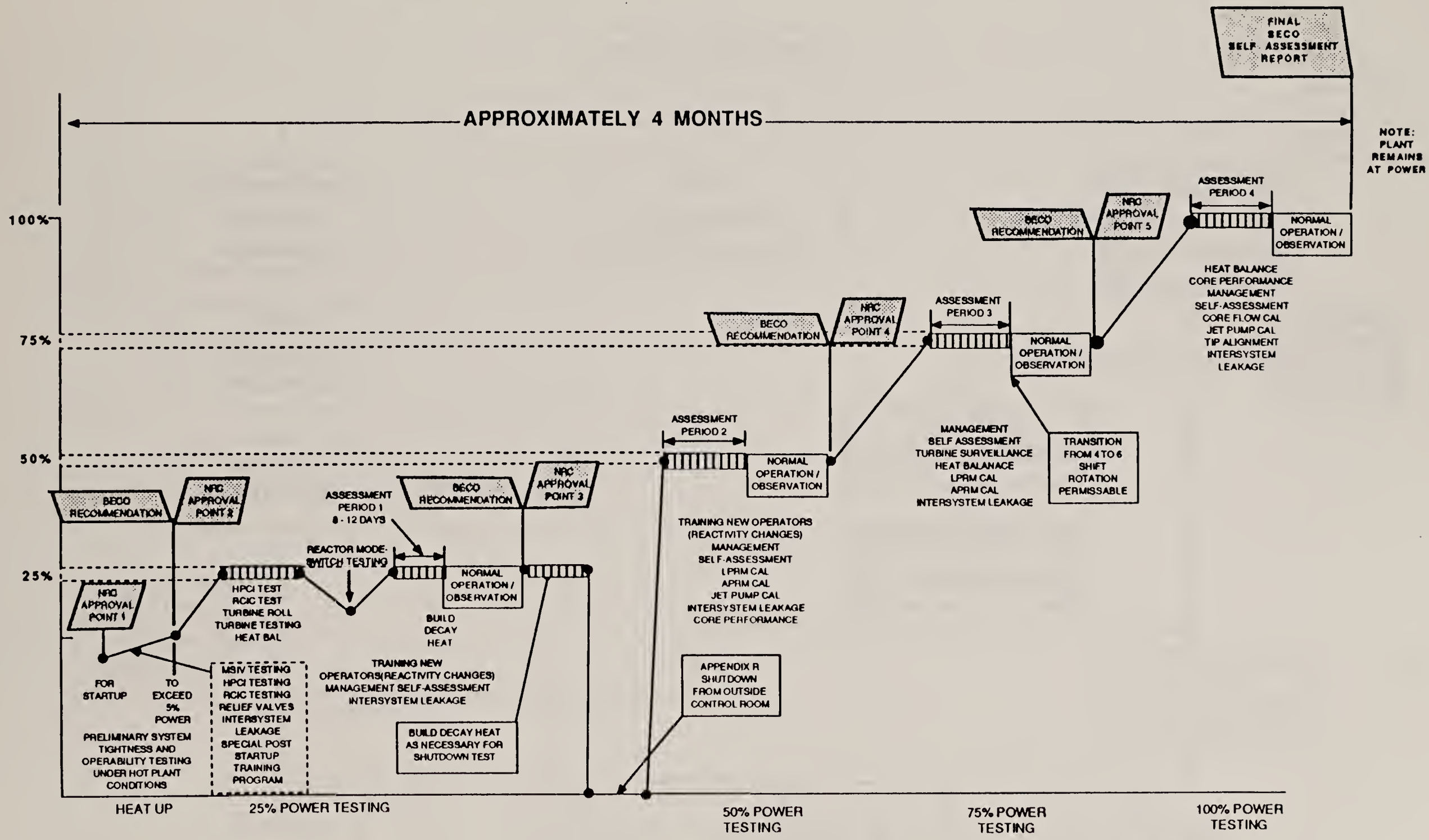
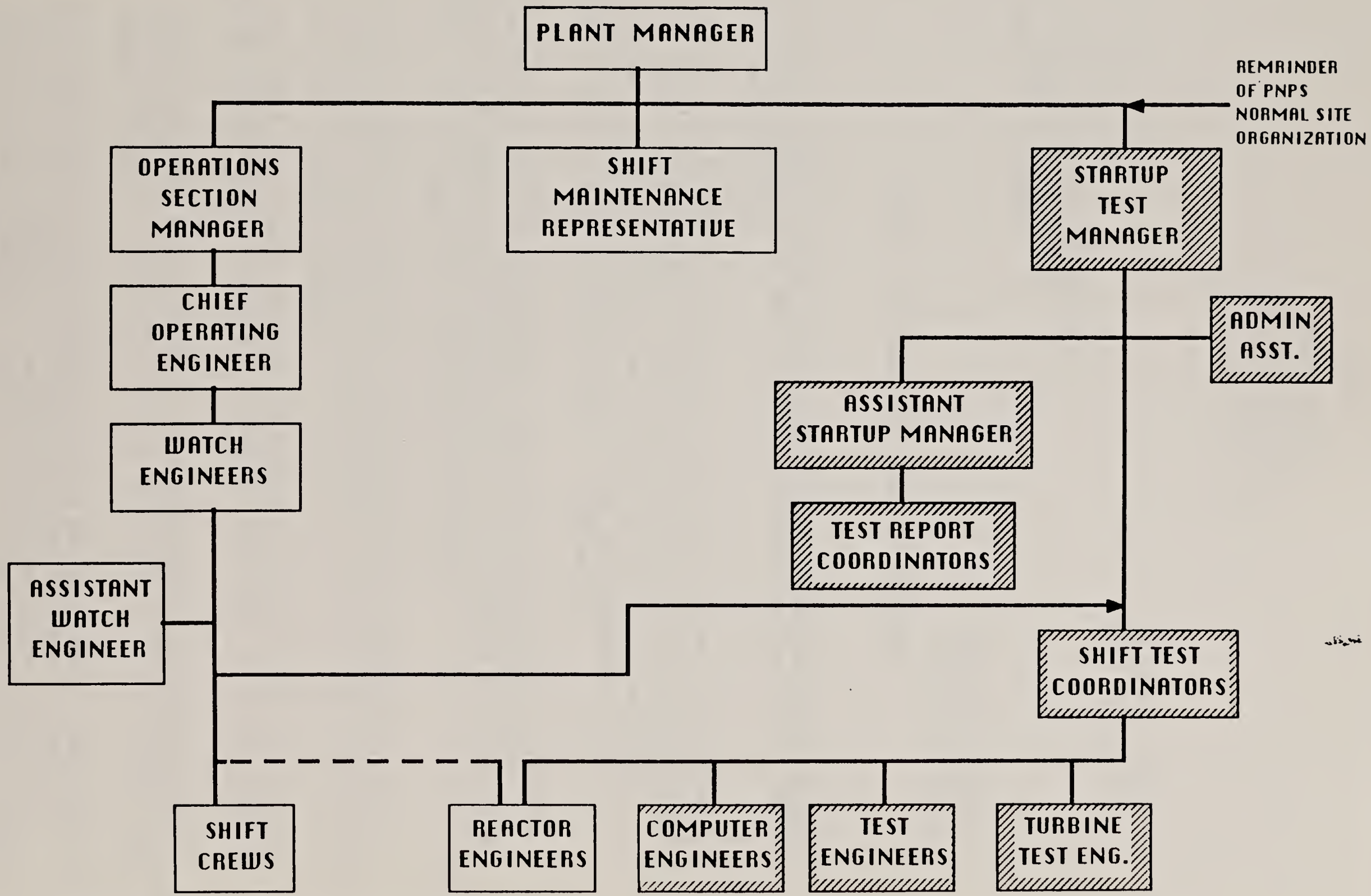


FIGURE 2

PILGRIM NUCLEAR POWER STATION STARTUP ORGANIZATION



NOTE: INDICATES PERSONNEL ASSIGNMENT FOR POST-OUTAGE TESTING

FIGURE 3

BOSTON EDISON

Pilgrim Nuclear Power Station
Rocky Hill Road
Plymouth, Massachusetts 02360

Ralph G. Bird
Senior Vice President — Nuclear

August 4, 1988
BECo Ltr. #88-117

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555

Docket No. 50-293
License No. DPR-35

Subject: Rosemount Transmitter "Ringing"

Dear Sir:

On February 29, 1988, Boston Edison Company (BECo) submitted letter 88-033 which provided responses to NRC questions and concerns regarding the Pilgrim Power Ascension Program.

We are providing additional information necessary to answer the question of how the Pilgrim test program will demonstrate and/or evaluate the extent to which Rosemount 1153 transmitters are sensitive to pressure oscillations during major transients, and whether "ringing" of the output will cause unnecessary actuations of safety systems. This was requested in the Management Meeting Summary for the April 8, 1988 meeting.

General Electric Service Information Letter (SIL) No. 463 and Engineering Service Request (ESR) No. 88-340 have identified the Rosemount 1153 transmitters as being susceptible to process noise inherent in various BWR systems. This noise, if left unchecked, may potentially result in operational problems such as inadvertent safety system initiation.

The Nuclear Engineering Department (NED) performed an evaluation of the Rosemount transmitters installed at Pilgrim under Plant Design Change (PDC) No. 84-70 and has concluded that Pilgrim's applications are not susceptible to a significant "ringing" problem.

The likelihood of an inadvertent safety system trip due to the sensitivity (ringing) of Rosemount transmitters at PNPS is very low. This conclusion is based on the following:

- Design conditions associated with the system noise sensitivity issue identified at other operating units do not exist at Pilgrim Nuclear Power Station (PNPS).

- PNPS Reactor Water Level transmitters have design response times that are much slower than other transmitters which have experienced problems elsewhere in the industry. The PNPS transmitter slower response time should prevent transmitter response to the noise characterized as causing problems at other plants.

- o PNPS Main Steam Line Flow transmitters would have to be subjected to noise of up to 25 psid to trip during transient conditions. This is physically unrealistic and well beyond the range of noise observed in the industry.

The above justification provides reasonable assurance that a significant "ringing" problem will not be experienced at PNPS during power operation. On this basis, a trip of the Analog Trip System (ATS) due to transmitter "ringing" is not expected. Should a trip of the ATS occur due to transmitter "ringing", this would not place the plant in an unsafe condition.

In order to confirm the absence of the "ringing" problem at the Pilgrim Station, Boston Edison Company is initiating the following action.

The Rosemount 1153 Transmitters that provide input signals to the Analog Trip System (ATS) installed during RFO#7 will be provided with monitoring tie-ins to the Emergency and Plant Information Computer System (EPIC). During Plant Operation the output of these instruments will be monitored and recorded for subsequent evaluation. If the EPIC System is operational, this monitoring will be performed during the Power Ascension Program (PAP); otherwise, it will be performed during Power Operations following the PAP. The results of this monitoring is expected to confirm the absence of the "ringing" problem at the Pilgrim Station.

No further action regarding the "ringing problem" associated with Rosemount Transmitters is planned at this time pending evaluation of the recorded EPIC data. Boston Edison will assess the significance of any identified "ringing" and decide whether further testing or other action is warranted.

Please do not hesitate to contact me directly if there are further questions or comments regarding this response.

R.G. Bird

RLC/bl

cc: Mr. William Russell
Regional Administrator, Region I
U.S. Nuclear Regulatory Commission
475 Allendale Rd.
King of Prussia, PA 19406

Sr. Resident Inspector - Pilgrim Station

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
475 ALLENDALE ROAD
KING OF PRUSSIA, PENNSYLVANIA 19406

MAY 17 1988

Docket No. 50-293

Boston Edison Company
ATTN: Mr. Ralph G. Bird
Senior Vice President - Nuclear
800 Boylston Street
Boston, Massachusetts 02199

Gentlemen:

Subject: Management Meeting to Discuss Licensee's Power Ascension Program

This letter transmits the details of the Management Meeting held on April 8, 1988 in the Region I office, King of Prussia, Pennsylvania to discuss NRC concerns regarding the licensee's Power Ascension Program.

We believe the discussions were constructive and beneficial to the NRC and the Boston Edison Company. As discussed during the meeting, items requiring followup were identified and are included in the enclosed report. If your understanding of these items differs, please contact M. Evans of our staff at 215/337-5184.

No reply to this letter is required; however, should you have any questions concerning this matter, we would be pleased to discuss them with you.

Sincerely,

FOR William V. Johnston, Director
Division of Reactor Safety

Enclosures:
1. NRC Region I Management Report
2. BECO Presentation Materials

cc w/encl:
K. Highfill, Station Director
R. Barrett, Nuclear Operations Manager
B. McIntyre, Chairman, Department of Public Utilities
Chairman, Plymouth Board of Selectmen
Plymouth Civil Defense Director
J. Keyes, Boston Edison Regulatory Affairs and Programs
E. Robinson, Nuclear Information Manager
R. Swanson, Nuclear Engineering Department Manager
The Honorable Edward J. Markey The Honorable Edward P. Kirby
The Honorable Peter V. Forman
S. Pollard, Secretary of Energy Resources
P. Agnes, Assistant Secretary of Public Safety, Commonwealth of Massachusetts
R. Shimshak, MASSPIRG
A. Blough, NRC:RI, Chief, Reactor Projects Section 3B, DRP
S. Collins, NRC:RI, Deputy Director, DRP
J. Durr, NRC:RI, Chief, Engineering Branch, DRS
M. Evans, NRC:RI, Operations Engineer, DRS
R. Gallo, NRC:RI, Chief Operations Branch, DRS
W. Johnston, NRC:RI, Director, DRS
W. Kane, NRC:RI, Director, DRP
D. McDonald, NRC:NRR, Project Manager
C. Warren, NRC, Senior Resident Inspector
J. Wiggins, NRC:RI, Chief, Reactor Projects Branch 3, DRS
Public Document Room (PDR)
Local Public Document Room (LPDR)
Nuclear Safety Information Center (NSIC)
NRC Resident Inspector
Commonwealth of Massachusetts (2)

U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Meeting No. 88-043

Docket No. 50-293

License No. DPR-35

Licensee: Boston Edison Company
800 Boylston Street
Boston, Massachusetts 02199

Facility Name: Pilgrim Nuclear Power Station

Meeting Location: NRC, Region I

Meeting Conducted: April 8, 1988

Reporting Inspector: Michele G. Evans 5-9-88
M. Evans, Operations Engineer, DRS date

Approved by: Daniel G. Lange 5-5-88
D. Lange, Chief, BWR Section, OB, DRS date

Meeting Summary: A licensee/NRC management meeting was held at the NRC Region I office on April 8, 1988, to discuss the licensee's Power Ascension Program. Licensee, NRC:Region I, and NRC:NRR management representatives were in attendance. Several items requiring either NRC or licensee followup were identified.

Details

1.0 Participants

1.1 Boston Edison Company (BECO)

J. Alexander, Operations Manager
R. Bird, Senior Vice President Nuclear
R. Ledgett, Director, Special Projects
L. Schmeling, Program Manager, Special Projects
J. Seery, Technical Section Manager
R. Swanson, Manager, Nuclear Engineering Department

1.2 General Electric Company

K. Nicholas, Technical Section

1.3 U.S. Nuclear Regulatory Commission

A. Blough, NRC:RI, Chief, Reactor Projects Section 3B, DRP
S. Collins, NRC:RI, Deputy Director, DRP
J. Durr, NRC:RI, Chief, Engineering Branch, DRS
M. Evans, NRC:RI, Operations Engineer, DRS
R. Gallo, NRC:RI, Chief Operations Branch, DRS
W. Johnston, NRC:RI, Director, DRS
W. Kane, NRC:RI, Director, DRP
D. McDonald, NRC:NRR, Project Manager
C. Warren, NRC, Senior Resident Inspector
J. Wiggins, NRC:RI, Chief, Reactor Projects Branch 3, DRS

2.0 Background and Purpose

The management meeting was held at the request of NRC:REGION 1. The licensee submitted a description of their Power Ascension Program to the NRC, per BECO letter 87-163 on October 15, 1987. Following NRC review of the submittal, a number of questions and concerns requiring further information for resolution were developed and addressed to the licensee on January 28, 1988. The licensee responded to these questions and concerns per BECO letter 88-033 on February 29, 1988. Upon review of the licensee's response, NRC:REGION 1 determined that a management meeting would be necessary in order to develop a full understanding of the licensee's Power Ascension Program and to address additional questions generated during review of the licensee's February 29, 1988 response.

3.0 Meeting Summary

The meeting was opened with brief comments by W. Johnston, Director, Division of Reactor Safety. Boston Edison (BECO) Senior Vice President - Nuclear, R. Bird presented a brief overview of the licensee's presentation. He discussed the status of valve alignments, surveillance logic testing and Power Ascension Procedures, and presented the

licensee's plans for GETARS analysis. Mr. J. Alexander, BECO Operations Manager, presented a description of the basis of the Pilgrim Power Ascension Program. Mr. R. Swanson, BECO Nuclear Engineering Department Manager, presented an overview of an analysis performed to demonstrate that plant modifications have not changed the dynamic response of the plant or invalidated the previous power level tests. In addition, Mr. Swanson discussed the licensee's position regarding the need to instrument the Rosemount level transmitters to detect "ringing problems".

Discussions were held regarding all items addressed by the licensee. Based upon these discussions it was agreed that:

- additional review by the NRC staff of the licensee's analysis of the affect of plant modifications on the dynamic response of the plant would be required to determine its acceptability.

- NRC:REGION 1 release from a hold point would occur following NRC review of licensee management assessment results.

In addition the licensee committed to:

- Provide GETARS analysis, throughout plant startup until the EPIC System is operational, of plant transients that related to modifications or identified problems (MSIV closure and mode switch).

- Provide copies of test procedures TP87-114 and TP87-147 to NRC:RI upon approval. In addition the licensee will revise TP87-114 to include a time period for completion of the independent review of procedure results; and, the criteria which must be satisfied in order to sign off the Management Assessment hold points in Table 2 of TP87-114.

- Due to a misunderstanding of the term "ringing" the licensee will resubmit a response to NRC's questions regarding "ringing problems" associated with Rosemount transmitters and instrumenting the level transmitters to adequately detect the "ringing problems".

The visual aids utilized during the presentation are attached for information.

Enclosure 2

Handouts

for

Boston Edison Company

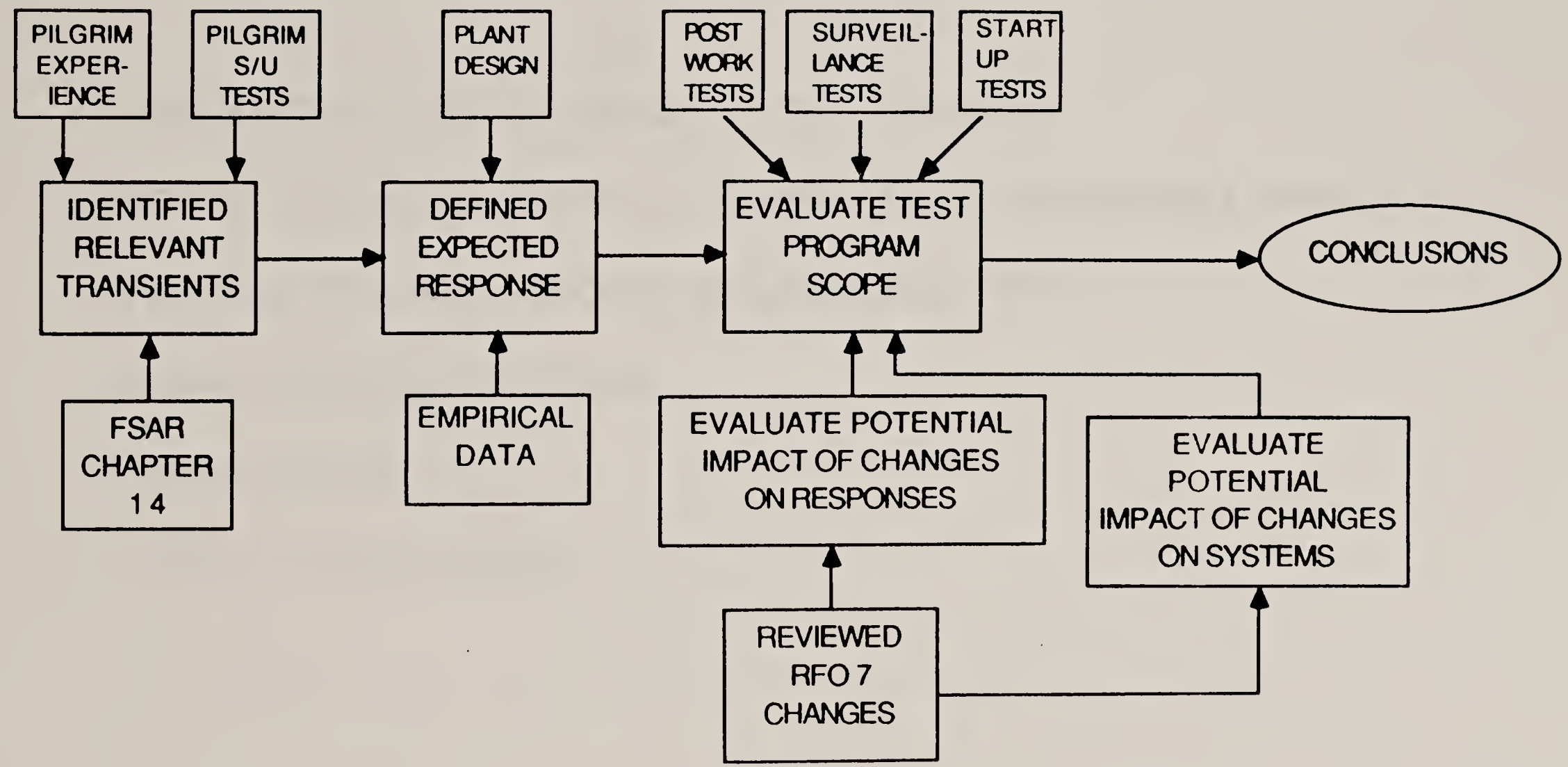
Presentation

April 8, 1988

AUGMENTED DESIGN REVIEW BOARD EVALUATED ADEQUACY OF DYNAMIC TEST PROGRAM SCOPE

- DISCIPLINED, STRUCTURED PROCESS
- PROGRAM EVALUATED ON TRANSIENT/SYSTEM BASIS
- PERFORMED BY DESIGN REVIEW BOARD WITH STATION PARTICIPATION
- REQUIRED OVER 1500 MANHOURS
- PLANNED SINCE MID-1987

PROGRAM EVALUATION USED STRUCTURED PROCESS



SELECTED RELEVANT TRANSIENTS FROM PLANT AND INDUSTRY ANALYSIS/EXPERIENCE

- PILGRIM INITIAL START-UP TRANSIENT TEST PROGRAM
- CURRENT NTOL INITIAL START-UP TRANSIENT TESTS (SHOREHAM, LIMERICK)
- OPERATING TRANSIENTS FROM PILGRIM FSAR CHAPTER 14
- PILGRIM OPERATING EXPERIENCE
  - MSIV CLOSURE
  - LOSS OF OFFSITE POWER

DEFINED EXPECTED PLANT RESPONSE BY ANALYSIS AND OPERATING EXPERIENCE

- PREDICTED BEHAVIOR OF KEY PARAMETERS

- DEFINED POSSIBLE PLANT SYSTEM RESPONSES
  - ACTUATIONS
  - ISOLATIONS

- CLASSIFIED POTENTIAL PLANT RESPONSE
  - ESSENTIAL
  - EXPECTED
  - UNWANTED
  - UNEXPECTED

- DEFINED TRANSIENT - RESPONSE MATRIX

- DETERMINED INITIATING DEVICES FOR EACH RESPONSE

IDENTIFIED CHANGES POTENTIALLY AFFECTING TRANSIENT RESPONSE

- IDENTIFIED RFO 7 CHANGES
  - PLANT DESIGN CHANGES
  - ENGINEERING EQUIVALENCY EVALUATIONS
  - COMMERCIAL QUALITY ITEMS
  - POTENTIAL "OPERATING EXPERIENCE" ISSUES
  - IN-PROGRESS EVALUATIONS (LERs, F&MRs)
  - MAJOR MAINTENANCE ACTIONS

- EVALUATED CHANGES FOR IMPACT
  - INITIATING DEVICES
  - EXPECTED PLANT ACTIONS
  - TRANSIENT INITIATION
  - KEY PARAMETER RESPONSE

- LISTED RELEVANT CHANGES ON TRANSIENT-ACTION MATRIX

EXAMINED POTENTIAL IMPACT OF CHANGES THROUGH INTEGRATED APPROACH

- ESTABLISHED PUNCH LIST OF CONSIDERATIONS
  - PRESSURE SPIKES
  - RESPONSE TIME
  - INSTRUMENT SENSITIVITY
  - VOLTAGE SPIKES
  - ENVIRONMENTAL TRANSIENTS
  - ETC.

- EVALUATED AGGREGATE CHANGE IMPACT ON TRANSIENT BASIS
  - EMPHASIZED POTENTIAL SYNERGISM
  - POSTULATED FAILURES & MALFUNCTIONS
  - "WHAT IF"

- DETERMINED WORST CASE POTENTIAL IMPACT ON EACH TRANSIENT
  - INITIATING DEVICES
  - PARAMETER RESPONSE

EVALUATED DYNAMIC TEST PROGRAM SCOPE ON SYSTEM-BASIS

- ESTABLISHED SYSTEMS VS MODIFICATION MATRIX

- SCOPE REVIEW INCLUDED MAJOR TEST CATEGORIES
  - POST WORK TESTS
  - SURVEILLANCE TESTS
  - STARTUP DYNAMIC TESTS

- POTENTIAL NEED FOR TWO ADDITIONAL TESTS (OUTSIDE POWER ASCENSION PROGRAM)
  - BACKUP NITROGEN
  - INTEGRATED ELECTRICAL TEST

INDEPENDENT REVIEW CONFIRMED ADEQUACY OF POWER ASCENSION PROGRAM TEST SCOPE

- CURRENTLY PLANNED DYNAMIC TEST SCOPE IS SUFFICIENT

- FURTHER REVIEWS ARE PLANNED
  - POST WORK TEST REVIEW OF 15 KEY DESIGN CHANGES
  - POST WORK TEST REVIEW OF 12 MAJOR MAINTENANCE TASKS
  - EVALUATE NEED FOR ADDITIONAL SYSTEMS TESTS (N2, ELECTRICAL)
  - EVALUATE SYSTEMS/SURVEILLANCE TESTS FOR COVERAGE (WHERE CREDITED)

- FUTURE EMERGENT ISSUES MAY REQUIRE FURTHER TESTS

BOSTON EDISON
Pilgrim Nuclear Power Station
Rocky Hill Road
Plymouth, Massachusetts 02360

Ralph G. Bird
Senior Vice President — Nuclear

February 29, 1988
BECo Ltr. 88-033

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555

Docket No. 50-293
License No. DPR-35

Subject: Response to NRC Questions and Concerns on the Pilgrim Power Ascension Program Plan and Confirmation of Agreement During 2/11/88 Telephone Conference.

Dear Sir:

Enclosed is Boston Edison Company's response to Mr. S.J. Collins letter of January 28, 1988 regarding the Pilgrim Power Ascension Program. Also enclosed is Boston Edison's confirmation of agreements made during our telephone conversation with Mr. Collins, other Senior NRC Managers and staff personnel on February 11, 1988 at approximately 1330 hours. As discussed in the above conversation, Boston Edison considers that a discussion between NRC and Boston Edison personnel interested in this matter, would be beneficial in assuring full understanding of the basis for the Power Ascension Program.

R.G. Bird

PJH/bl

Enclosure: Enclosure 1 and 2

Attachment: Attachment A and B

cc: Mr. William Russell
Regional Administrator, Region I
U.S. Nuclear Regulatory Commission
475 Allendale Rd.
King of Prussia, PA 19406

Mr. Samuel J. Collins
Deputy Director Division of Reactor Projects
U.S. Nuclear Regulatory Commission
475 Allendale Rd.
King of Prussia, PA 19406

SR. Resident Inspector - Pilgrim Station

Enclosure I - Response to NRC Questions and Concerns on Pilgrim Power Ascension Program Plan

Background:

Questions #2 and #3 appear to be related to the technical issues raised in Confirmatory Action Letter (CAL) 86-10. The pre-startup corrective actions to address the CAL 86-10 issues have been completed. These corrective actions were reviewed by NRC Region I Inspectors on September 21-25, October 5-9 and October 12-23, 1987 at Pilgrim Station. The results of these reviews are documented in NRC Inspection Report 50-293/87-46 pages 11 & 12, dated December 7, 1987 and in Boston Edison's exit meeting minutes for Inspection 87-46.

A list of the Boston Edison submittals to the NRC and the NRC Inspection Reports that address CAL 86-10 is provided (Attachment A).

NRC Question #1.

How will management assessment of performance at each plateau in the power ascension program be documented?

Response to Question #1

Management assessments of performance will be documented on a standard form entitled, "Assessment Summary" to be completed by the Oversight and Assessment Team and signed by the team members. This form is being issued as part of a training module for training of the Oversight and Assessment Team.

NRC Question #2.

How will it be demonstrated that major plant transients (such as scrams from high power and flow) will not induce MSIV closures, since the cause for previous MSIV closures has not been conclusively determined?

Response to Question #2

The spurious closures of the MSIVs which have been the subject of intensive evaluation did not occur during high power or high flow conditions. In both events MSIV closures occurred with the mode switch in the startup/hot standby position. Plant testing with the mode switch in the run position would not address the MSIV closure issue observed in April 1986.

The potential contributors to the inadvertent MSIV closures were identified as:

(1) Mode switch

(2) Water level instrumentation

(3) Loose grounding connections of PCIS relays.

Boston Edison believes that the cause of inadvertent MSIV closures has been corrected by:

1. Replacement of the mode switch

2. Replacement of water level instrumentation

3. Repairing the neutral connections on the PCIS relays.

To demonstrate that future reactor start up and shutdown transients will not induce MSIV closures, a test (TP 86-81) will be conducted as part of the Power Ascension Program. Conduct of this test will attempt to duplicate, under controlled conditions, the plant power and flow conditions of 4/4/86 and 4/12/86 when the MSIV's unexpectedly closed. The test will utilize General Electric Transient Analysis Recording equipment to monitor the trip signals which may have led to the original MSIV closures in April 1986. If the MSIVs do not close under the duplicate conditions, then we will have demonstrated that the actions taken to resolve the problem were successful and corrected the problem.

Question #3 and #4:

How will it be demonstrated that plant response to MSIV closure transients is still in accordance with design? (Your response should address any procedures and personnel responses necessary to safely accommodate the transient.)

How will it be demonstrated that the dynamic response of the plant to a Loss of Offsite Power event, at power, is in accordance with design? (Your response should address whether procedures and personnel training are appropriate to safely accommodate this transient.)

Response to Questions 3 and 4

The questions relate to plant response after MSIV closures and loss of offsite power. During the events of April 4 and April 12 the plant transient response to the inadvertent MSIV closures was in accordance with design. Loss of offsite power was not associated with the April 4 or April 12 events. The loss of power event that occurred on November 12, 1987 was with the reactor shutdown and therefore did not exhibit any unexpected plant dynamic response.

Review of the original startup test program showed that:

(1) The MSIV response was in accordance with the design.

(2) The plant response to loss of offsite power was in accordance with the design.

A review of past plant history has identified transient events which demonstrated that the MSIV's responded in accordance with the design. The same review also identified loss of offsite power events where the plant responded according to design. We therefore believe that the original startup testing, the plant transient history, and loss of offsite power events have adequately demonstrated that the plant responds according to design.

Additionally, when unplanned events occur during plant operation, the actual plant response is evaluated and examined for indications of abnormal behavior per procedure 1.3.37 "Post Trip Review". This procedure was reviewed by the NRC as part of NRC's audit of BECo's response to Generic Letter 83-28.

You further inquired about procedures and personnel training necessary to safely accommodate plant transient responses from these events. These transients are treated in operating procedures and are covered by existing routine training and by special simulator refresher and EOP training.

NRC Question #5

How will the test program demonstrate and/or evaluate the extent to which Rosemount 1153 transmitters are sensitive to pressure oscillations during major transients, and whether "ringing" of the output will cause unnecessary actuations of safety systems?

Response to Question #5

No special actions for Rosemount Transmitters are planned based on the following:

(1) Rosemount, based on it's industry wide investigation, has advised Boston Edison that occurence

    a. is not wide spread

    b. has never happened simultaneously to two transmitters in a plant

    c. is random

(2) a single transmitter failure would not actuate a safety system when redundant channels are in service

(3) adequate controls exist to detect transmitter performance abnormalities.

The Rosemount transmitters installed at Pilgrim this outage that could be susceptible to sensitivity problems are part of the Analog Trip System. In this system, the circuit logic requires a coincident transmitter signal from redundant trip channels to actuate a safety system. Therefore a single transmitter failure would not challenge a safety system when redundant channels are in service, nor would it preclude actuation if needed.

The surveillance program for these transmitters is a once per day channel check which compares the redundant channels for each parameter. The surveillance provides a direct indication of transmitter performance and is adequate to detect a small on-scale shift.

NRC Question #6

What will be the administrative controls for conduct of testing and review of test results, including control of the performance of testing, methods for recording, evaluating, reviewing and approving test data and results, and the methods for identifying and correcting deficiencies noted in systems and procedures?

Response to Question #6

The details of the administrative controls for conduct of testing and review of test results during the Power Ascension Program are documented in an internal BECo memorandum of January 29, 1988 from the Plant Manager to managers in the Nuclear Organization.

While this memorandum is an internal document which would not ordinarily be forwarded to the NRC, we are providing this (see Attachment B) in accordance with your specific request during the 2/11/88 telephone conference.

Enclosure 2 - Confirmation of Agreements During 2/11/88 Telephone Conference

On 2/11/88 a telephone conference between managers from NRC Region I, NRR, NRC Resident Inspectors and Boston Edison was conducted. The purpose of the conference was to discuss the technical basis for Boston Edison's response to the NRC's letter of January 28, 1988 which transmitted questions and concerns on the Pilgrim Power Ascension Program.

AGREEMENTS

1. During the Power Ascension Program Boston Edison will release Pilgrim for New England Power Exchange dispatch as soon as the reactor reaches full power.

2. When Pilgrim reaches 100% reactor power, Boston Edison will conduct its final assessment of the Power Ascension Program at Assessment Point 4. The results of this final assessment will be recorded, documented and submitted to the NRC to document closure of the Power Ascension Program.

Attachment A

Boston Edison Submittals and NRC Inspection Reports Addressing Technical Issues Raised in Confirmatory Action Letter (CAL) 86-10

DATE	DESCRIPTION	LETTER NO./REPORT NO.
5-15-86	BECo's first response to NRC Confirmatory Action Letter #86-10.	LTR. #86-062
5-16-86	Augmented Inspection Team (AIT) Report	RPT #86-17
6-16-86	BECo's second response to to NRC Confirmatory Action Letter #86-10.	LTR #86-079
8-29-86	BECo's supplemental response to NRC Confirmatory Action Letter #86-10.	LTR #86-128
9-17-86	BECo's submittal of additional information as committed in Letter #86-128.	LTR #86-141
3-1-87	BECo's response to NRC letter concerning Management Meeting 50-293/86-41.	LTR #87-039
7-30-87	BECo's transmittal of the Restart Plan (Rev. 0).	LTR #87-130
10-15-87	BECo's transmittal of the Power Ascension Program.	LTR. #87-163
10-26-87	BECo's transmittal of Volume 2, Rev. 1 of the Restart Plan.	LTR. #87-172
12-1-87	NRC Inspection Report (closure of 86-17-04).	RPT. #87-42
12-7-87	NRC Inspection Report (closure of 86-17-02) (update of 86-17-01).	RPT. #87-46

ATTACHMENT B

OFFICE MEMORANDUM

BOSTON EDISON COMPANY

TO: Distribution FROM: R. J. Barrett Record Type A4.08

DATE: January 29, 1988 Dept Doc. PM 88-062

Subject: **DESCRIPTION OF POWER ASCENSION TEST PROGRAM**

DISTRIBUTION:

R. G. Bird	K. L. Highfill	R. N. Swanson
R. A. Ledgett	E. J. Howard	D. L. Gillispic
R. J. Barrett	All Section Managers	

I. PURPOSE:

The purpose of this document is to define and establish the following in the temporary Post-Refueling/Outage Test Organization:

A. Define the relationship of the Test Organization to Operations organization.

B. Definition of the organization and description of the duties and responsibilities of personnel assigned.

C. Describe the scheduling of testing.

D. Describe the conduct of testing.

E. Describe the independent review of completed test data.

II. BACKGROUND:

Experience from the testing program after RFO-6 and prudence dictate that the conduct of post-outage testing be carefully planned and controlled in order to ensure completeness, safety and effectiveness. The following sections of this program description document define the scheduling, conduct, and review of testing to be accomplished during startup from RFO-7.

DOCUMENT RELEASED FEB 5 1988 FOR USE CONTROL STATION 3

III. RELATIONSHIP OF THE TEST ORGANIZATION TO THE NUCLEAR WATCH ENGINEER (NWE) AND HIS SECTION CREW

The NWE is the senior licensed operator on watch and has complete responsibility for operation of the plant. The Test Organization is subordinate to the NWE. The NWE's concurrence and permission must be obtained for the conduct of all tests. Direction must not be given to watch section operators for operation of plant equipment except as it pertains to conduct of previously authorized tests. The Shift Test coordinator (STC) must work closely with the NWE, may advise him, but must exercise exceptional care to not interfere with the NWE and his operators in discharge of their license and operational duties.

IV. STARTUP TEST ORGANIZATION

The following are descriptions of the duties and responsibilities of defined positions in the Startup Test Organization. The Startup Test Manager may assign additional personnel to perform specific tasks in addition to the positions described herein. An organizational diagram of the Startup Organization showing the relationship of the temporary startup test organization and the permanent station organization is shown in Figure 1.

STARTUP TEST ORGANIZATION

POSITION RESPONSIBILITIES

A. **STARTUP TEST MANAGER** (J. A. SEERY)

Major duties and responsibilities of this position are:

1. Development of the Power Ascension Schedule.
2. Development and staffing of the Startup Test Program.
3. Development of a master power ascension test procedure.
4. Ensuring all test procedures required for the startup and testing are approved.
5. Day to day management of the Power Ascension Program keeping the Plant Manager informed of progress and problems.
6. Approval of completed startup test reports.
7. Recommendations to the Plant Manager when the plant is ready to ascend to the next test plateau.
8. Scheduling of testing and promulgation of the test schedule.
9. Interface with the Operations Section Manager to ensure testing and normal plant operations are efficiently scheduled.
10. Direction of the Shift Test Coordinators.
11. Ensuring complete test data review.
12. Approve a waiver of a discretionary test in TP 87-114.

B. **ASSISTANT STARTUP TEST MANAGER** (K. R. NICHOLAS)

This position reports to the Startup Test Manager and is responsible to him for the following duties:

1. Development of test reports, as necessary.
2. Technical advice in development of the schedule and necessary changes.
3. Assistance in development of a startup test organization and position responsibilities.

4. Assistance in development of a master power ascension procedure.

5. Assistance in the day to day management of the Power Ascension Program as necessary.

6. Ensuring that test data is reviewed for acceptance by the proper technical review group.

7. Technical and completeness review of completed test reports and submission to the Startup Test Manager for approval.

C. REPORT WRITERS

This position reports directly to the Assistant Startup Manager. Their duties are as follows:

1. On a daily basis, collecting completed tests from the Shift Test Coordinator

2. Reviewing test for completeness

3. Preparing test reports for the Assistant Startup Manager's review

4. Assisting the Assistant Startup Manager as required

D. SHIFT TEST COORDINATORS (P. SMITH, J. BELLEFEUILLE, P. MANDERINO, J. SABINA)

Shift Test coordinators will maintain shift coverage during the testing phase. They will assist the on-shift Nuclear Watch Engineer by coordinating all testing for that shift and obtaining his permission to conduct testing.

Their duties will consist of, but not be limited to the following:

1. Ensuring tests are conducted in a formal and professional manner.

2. Ensuring tests are conducted using approved procedures.

3. Assisting the NWE in the conduct of pre-test briefings with the shift crew as necessary.

4. Keeping abreast of current plant status.

5. Ensuring test procedures are properly controlled.

6. Maintaining a shift log of the testing status progress on a shift basis.

7. In conjunction with the Nuclear Watch Engineer, recommending changes to the suggested critical path schedule when necessary.

8. In conjunction with the Watch Engineer, recommending waiver of discretionary tests in TP87-114.

9. Keeping the Startup Test Manager informed in a timely manner of the status of testing and of problems encountered.

E. **REACTOR ENGINEERS, (J. ABOLTIN) COMPUTER ENGINEERS, TEST ENGINEERS, TURBINE TEST ENGINEERS, AND TEST AND TURNOVER ENGINEERS**

The generic responsibilities of these positions are similar. These are the Test Directors. They are responsible for directing and conducting their assigned tests. On shift they report to the Shift Test Coordinators.

Their duties will consist of, but not be limited to, the following:

1. Directing performance of their approved test after NWE concurrence and permission has been obtained.

2. Keeping the Shift Test Coordinator and Nuclear Watch Engineer informed of test status and affects on plant conditions.

3. Assisting in pre-test briefings with the shift crew as necessary and directed by the NWE.

V. NUCLEAR ORGANIZATION SUPPORT FOR OPERATIONS

The restart from RFO-7 will be achieved with the normal plant support functions, e.g., Nuclear Engineering, Quality Assurance/Quality Control, Security, Fire Protection, Planning/Scheduling and Cost Control, Technical Support, and other nuclear organization groups.

A. Due to the complexity of this outage, there will be a Shift Maintenance Representative, as shown and described in BECo Ltr. 87-163.

B. Quality Assurance coverage, although functioning through normal channels will be expanded during the preparation and testing phases of power ascension. Around the clock coverage will be provided by approximately 9 dedicated inspectors. A QA checklist developed specifically for power ascension will be used. Dedicated coverage of chemistry will also be provided.

VI. CONDUCT OF TESTING

A. This section descr.bes the mechanism for the conduct of testing during the Power Ascension Program.

B. REFERENCES: (Latest revision unless otherwise indicated)

1. ANSI N.18.7-1976 Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants

2. ANSI N.45.2.6-1978 Qualifications of Inspection, Examination, and Testing Personnel for Nuclear Power Plants

3. ANSI N.45.2.11-1974 Quality Assurance Requirements for the Design of Nuclear Power Plants

4. BECo Quality Assurance Manual, Volume II, Section II

5. PNPS Technical Specifications, Section 6.8

6. Procedure 1.3.4 - Procedures

7. Procedure 1.4.5 0 PNPS Tagging Procedure

8. Procedure 1.5.3 - Maintenance Request

C. DEFINITIONS:

1. PDC - Plant Design Change

2. ORC - Operations Review Committee

3. DCC - Document Control Center

4. SRO - Senior Reactor Operator

5. MR - Maintenance Request

6. RWP - Radiation Work Permit

7. TP - Temporary Procedure

8. TD/TE - Test Director/Test Engineer. The TD/TE is the individual responsible for coordinating the performance of a test after permission of the NWE has been obtained.

9. STC - Shift Test Coordinator. The STC is the individual who is responsible for management of all testing conducted on his shift. An STC can have several Test Engineers reporting to him. The STC reports to the Startup Test Manager.

10. PNPS - Pilgrim Nuclear Power Station

D. **PREREQUISITES:**

The Startup Test Manager will assign Shift Test Coordinators (who meet appropriate educational and experience requirements of ANSI N.45.6-1978). He will certify each STC for the appropriate level using the Test Director Qualification Sheet. These certifications will be maintained on file within the Startup Test Organization.

E. **TEST PREPARATION:**

1. Upon authorization by the NWE of tests scheduled for that shift, the Shift Test Coordinator can make preparations to start the test.

2. Prior to the actual start of the test, the STC will ensure the following:

a. That a latest revision of the procedure has been obtained from the DCC.

b. That the procedure to be used is the same revision as the one in the Control Room and is marked "Working Copy".

c. That an approved Maintenance Request is ready for use (if needed).

d. That an RWP has been approved (if needed) and is ready to support the test.

e. That plant operating conditions and system status required for the test have been set.

f. That manpower and equipment needed are scheduled and available.

g. That all prerequisites stated in the prerequisite section of the test procedure are satisfied.

F. CONDUCT OF TESTING:

1. During the conduct of the test, the Test Engineer will ensure that the personnel conducting the test are cognizant of all requirements of the test such as:

   a. All prerequisites listed under Section VI of the procedures "Prerequisites".

   b. All personnel initialing the procedure will sign their full name on a Signature Identification Sheet.

   c. Any calibrated equipment which is part of the Meter and Test Equipment (M & TE) System being used is listed on an equipment log. If the equipment being used is not part of the M & TE System, a Calibration Data Sheet will be attached as an addendum to the log.

   d. Test procedures, unless specifically stated, do not permit any exceptions. Any changes to the procedure will be in accordance with PNPS 1.3.4.

2. If a problem is encountered during the conduct of a test the following steps will be taken:

   a. Hardware problems - If a hardware problem is encountered, the TE will stop the test. A trouble shooting MR will be initiated by the TE. All necessary manpower will be obtained for trouble shooting. The scope of trouble shooting will be to the extent of identifying the components affected. Problems identified will be repaired using normal station repair procedures. After the problems are repaired, the test may again be schedule by the Startup Test Group for completion.

   b. Software problems - If the problem encountered is procedural, the Test Engineer will stop the test, obtain the necessary change to the Test Procedure in accordance with Station Procedure 1.3.4. The Test Engineer may resume the test after the changes are made, and with the approval of the Shift Test Coordinator and the NWE.

   c. The TE is responsible for timely notification of the Nuclear Watch Engineer and the STC of any problems encountered and of completion of the test.

NOTE:

In sections a. and b. above, if the test procedure permits the TE to do other sections which are independent of the section being reworked (hardware) or revised (software), the TE can continue with the other independent portions of the test with the concurrence of the STC and NWE.

G. **TEST VERIFICATION:**

1. After the test is complete, the TE will review the test to ensure the following:

   a. That the test was conducted as written without any discrepancies or exceptions.

   b. That the acceptance criteria of the applicable steps have been satisfactorily met.

   c. That the QC Group has reviewed all their hold and witness points and has signed off appropriate steps in the procedure.

2. When the above steps are completed, the TE can then sign Section XI of the procedure for Test Completion. The TE will then submit the test to the STC for his review.

3. The Shift Test Coordinator will review the entire test procedure to ensure that:

   a. All aspects of the test have been completed in accordance with station procedures.

   b. All revisions of the procedure used during the test are available and attached to the final revision.

   c. After Sections G.3.a and G.3.b above, are completed the STC will sign Section XI, of the procedure if required, of the procedure for the STC. The procedure will now be presented to the Nuclear Watch Engineer for review and approval for completeness.

   d. After the Nuclear Watch Engineer has signed the procedure, the procedure will be sent to the Assistant Startup Manager.

4. The Assistant Startup Manager will coordinate the independent review of the test packages. Submit to the Startup Test Manager a completed test package including the independent review results for his approval.

5. The Startup Test Manager will review the test procedure along with the results of the independent review described in Section VII below. After approving the test, he will attach the independent review to the procedure and transmit to Document Control for capture.

VII. INDEPENDENT REVIEW OF TEST RESULTS

An independent review of the test results obtained during the Power Ascension Test Program will be performed by the Systems Group. The support of personnel from the other groups such as NED and Operations will be required as appropriate for their specific expertise.

The review will include but not be limited to the following:

- Verification that the test was performed as written.
- All data was taken and recorded as required.
- All acceptance criteria were satisfied.

After completing the independent technical review of a completed test procedure the Systems Group Leader will notify the Startup Test Manager in writing of the findings. The Startup Test Manager will review and collect all independent review sheets. After all applicable procedures have been satisfactorily performed and reviewed, the Startup Test Manager will submit a commitment close-out memo to Compliance.

VIII. SCHEDULING OF TESTING

A. The Startup Test Manager is responsible for scheduling of testing and promulgation of the test schedule. To discharge these responsibilities he will do the following:

1. Schedule testing on a shift basis. When tests are required to be done in a specific sequence, that constraint will be clearly indicated in the schedule. In forming the test schedule the Startup Test Organization and the Operations Section will coordinate to ensure safe and efficient plant operation.

2. The Power Ascension Test Schedule will be approved by the Operations Section Manager. This will be integrated intc a Plan of the Day (POD) which is approved by the Plant Manager. The POD will be issued for a specific period of time, with an effective date/time and an expectation date/time.

3. The testing schedule may be extended or changed with formal concurrence of the Startup Test Manager and the Operation Section Manager. During periods when either or both of these managers are not on site, the STC may obtain concurrence by telephone from the absent manager and approve test schedule changes for these managers "per telcon" noting the date and time telephone concurrence was obtained. The absent manager will sign the appropriate approval during the next day the manager is on site.

IX. COMMUNICATIONS DURING TESTING

A. Communications during testing will be conducted in a precise and professional manner. A good model for use in the conduct of testing communications is SI-OP.0006.

B. Communications equipment to be used in testing will be tested for operability whenever possible, in advance of the start of the test. Use of the plant paging system for routine operational communications during testing should be minimized and used only when no other appropriate communications paths are available.

X. TESTING SUPPORT

Testing support may be requested from various NUORG organizations by the Startup Test Manager, the Assistant Startup Manager and Shift Test Coordinators. Support may be requested in addition to that specified in this document from Engineering, Maintenance and Operations. Any difficulty encountered in obtaining added support shall be resolved by the Startup Test Manager through the appropriate chain of command.

XI. SEQUENCING OF THE POWER ASCENSION TEST PROGRAM

Conduct of the test program descriptions of major test and schedules and notices for the test program are contained in Attachment 1, TP 87-114, Restart Test after RFO-7. Attachment 1 shall be the governing document for scheduling and sequencing of testing. Changes to the intent of Attachment 1 shall be made only after the approval of the ORC is received, using proper procedures for such changes.

PILGRIM NUCLEAR POWER STATION STARTUP ORGANIZATION

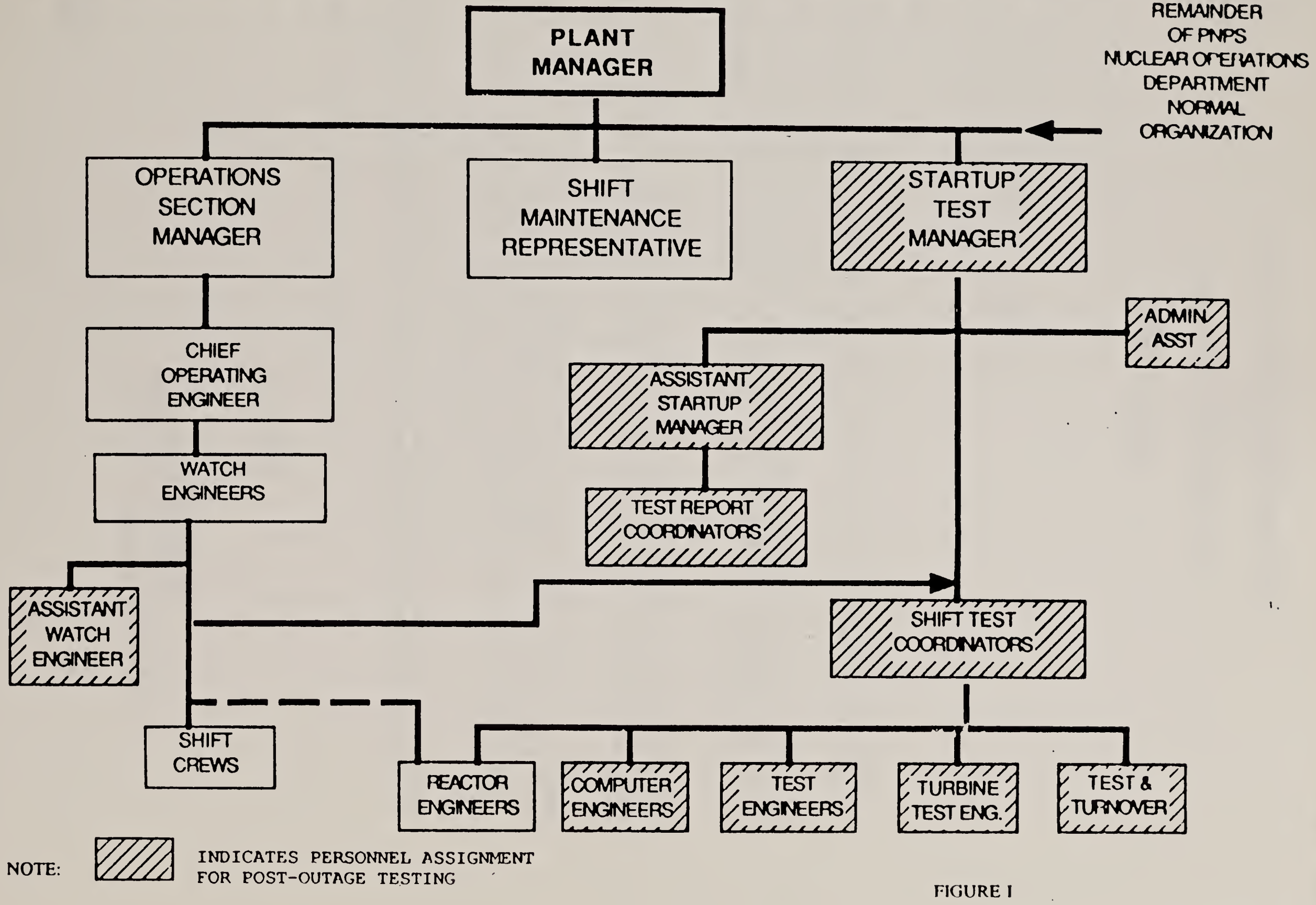


FIGURE I

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
475 ALLENDALE ROAD
KING OF PRUSSIA, PENNSYLVANIA 19406

JAN 28 1988

Docket No. 50-293

Boston Edison Company
ATTN: Mr. Ralph G. Bird
Senior Vice President - Nuclear
800 Boylston Street
Boston, Massachusetts 02199

Gentlemen:

This letter is in response to your submittal of your Power Ascension Program, dated October 15, 1987, for the startup and return to service of the Pilgrim Nuclear Power Station from the current outage.

During the course of our review, we have developed a number of questions and concerns which require further information for resolution. They are listed in the Attachment to this letter. Please provide a written response within 30 days.

As indicated in the enclosure, we are particularly interested in discussing the merits of conducting additional tests not currently included in your program. Please contact our office to discuss this matter prior to submission of your written response.

In addition, we propose a final NRC hold point at the completion of a period of operation, testing and self-assessment at full power. Prior to release from that final hold point, you should formally submit the results of your management assessment (Assessment Point No. 4) to NRC Region I to aid in our evaluation of your readiness for continued operation.

The response directed by this letter is not subject to the clearance procedures of the Office of Management and Budget as required by the Paperwork Reduction Act of 1980, PL 96-511.

Thank you for your cooperation in this matter.

Sincerely,

Samuel J. Collins, Deputy Director
Division of Reactor Projects

Attachment:
As stated

cc w/attachment:
K. P. Roberts, Nuclear Operations Manager
P. Levy, Chairman, Department of Public Utilities
Chairman, Board of Selectmen
Plymouth Civil Defense Director
J. D. Keyes, Boston Edison Regulatory Affairs and Programs
E. D. Robinson, Nuclear Information Manager
R. N. Swanson, Nuclear Engineering Department Manager
The Honorable E. J. Markey
Senator Edward P. Kirby
The Honorable Peter V. Forman
S. Pollard, Secretary of Energy Resources
P. W. Agnes, Assistant Secretary of Public Safety, Commonwealth of Massachusetts
R. Shimshak, MASSPIRG
Public Document Room (PDR)
Local Public Document Room (LPDR)
Nuclear Safety Information Center (NSIC)
NRC Resident Inspector
Commonwealth of Massachusetts (2)

ATTACHMENT

NRC Questions and Concerns on Pilgrim Power Ascension Program Plan

1. How will management assessment of performance at each plateau in the power ascension program be documented?

2. How will it be demonstrated that major plant transients (such as scrams from high power and flow) will not induce MSIV closures, since the cause for previous MSIV closures has not been conclusively determined?

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6. What will be the administrative controls for conduct of testing and review of test results, including control of the performance of testing, methods for recording, evaluating, reviewing and approving test data and results, and the methods for identifying and correcting deficiencies noted in systems and procedures?

BOSTON EDISON
Executive Offices
800 Boylston Street
Boston, Massachusetts 02199

Ralph G. Bird
Senior Vice President — Nuclear

October 15, 1987

BECO Ltr. #87-163

U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

License No: DRP-35
Docket No: 50-293

Subject: **Pilgrim Nuclear Power Station**
Power Ascension Program

Dear Sir:

In accordance with the discussions between Boston Edison and the NRC Staff on September 3, 1987, this letter transmits for information a description of the Power Ascension Program and associated Boston Edison processes for assessment of performance during power ascension. The Power Ascension Program is submitted for information and review. Three NRC approval points are submitted for NRC review and approval.

Boston Edison has determined that the description of the Power Ascension Program and associated Boston Edison process for assessment of performance during power ascension should be expanded beyond the level of detail contemplated in the Restart Plan Volume 1, Chapter IV and Volume 2, Appendix 13. Accordingly, Boston Edison will not submit Volume 2, Appendix 13 to the NRC, but is providing an expanded description of the Power Ascension Program and associated process for management assessment as an attachment to this letter.

The Power Ascension Program includes a description of the logic plan for power ascension, Boston Edison's assessment points, the proposed NRC approval points, the startup organization and the management assessment process. As the final phase of the Restart Plan, the Power Ascension Program is the mechanism by which Boston Edison will demonstrate the effectiveness of its programs, plans and actions to assure safe and reliable restart and continued operation.

Please contact me, or R.A. Ledgett of my staff, if you have questions or need additional information concerning the PNPS Power Ascension Program.

R. G. Bird

Attachment

cc: U.S.N.R.C. - Region I
631 Park Avenue
King of Prussia, PA 19406

William T. Russell, Regional Administrator
U. S. Nuclear Regulatory Commission - Region I
631 Park Avenue
King of Prussia, PA 19406

R. H. Wessman, Project Manager
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7920 Norfolk Ave.
Bethesda, MD 20814

Senior NRC Resident Inspector
Pilgrim Nuclear Power Station

BOSTON EDISON COMPANY

PILGRIM NUCLEAR POWER STATION

Power Ascension Program

October 15, 1987

POWER ASCENSION PROGRAM

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Glossary of Acronyms

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Figure 3

I. Introduction

This document describes the Power Ascension Program for the restart of Pilgrim Nuclear Power Station (PNPS) from the current outage (RFO-7). The Power Ascension Program is the final phase of the PNPS Restart Plan and is the mechanism by which Boston Edison will demonstrate the effectiveness of its programs, plans and actions. This program description should be read in conjunction with the Restart Plan, dated July 30, 1987, to understand the scope of programs, plans and actions undertaken by Boston Edison to assure safe and reliable restart and continued operation.

The program description is organized to describe the Power Ascension Program in the following sequence:

- Logic Plan
- Management Assessment Points and NRC Approval Points
- Startup Organization
- Management Assessment Process

The management assessment description includes Boston Edison's process both for confirming readiness for initial criticality and for oversight and assessment during power ascension. This assessment process includes close monitoring and evaluation of personnel and plant performance by Boston Edison nuclear managers, with personal observation by senior nuclear managers.

II. Power Ascension Logic Plan

Boston Edison has developed a power ascension logic plan for the testing, restart and power ascension from RFO-7. The bases for this logic plan and the sequence of power ascension steps and associated tests are described in this section. The management assessment process, including the management Assessment Points, is integrated into the logic plan.

A. Bases for Logic Plan

The power ascension logic plan is based on and complies with the PNPS Technical Specifications. In addition, the plan considers prior power ascension experience at PNPS, specific testing requirements for the work accomplished in RFO-7, personnel and equipment performance evaluation, Nuclear Regulatory Commission (NRC) approval points and prior relevant nuclear industry experience.

Power ascension experience from prior PNPS refueling outages is incorporated into the power ascension logic plan. The plan utilizes the sequence of power ascension that was proven successful in RFO-6. In addition, checklists for plant operational condition changes, which were first used to track the completion of designated RFO-6 milestones leading to restart during the recirculation pipe replacement work, have been expanded and refined for use during RFO-7 power ascension.

Several specific hardware performance problems led directly to the plant shutdown that resulted in RFO-7. Therefore, in the course of power ascension, special tests will be conducted to verify proper operation of that hardware under certain plant operating conditions. These special tests are to confirm:

(1) the main steam isolation valves' ability to open with normal differential pressure across them;

(2) the adequacy of the monitoring method and procedure in the event of leakage from the reactor to low pressure portions of the Residual Heat Removal System; and

(3) that main steam isolation valves remain open during reactor depressurization after the mode switch has been shifted from "Run" to "Startup".

An additional test unique to this startup is a shutdown-from-outside-the-Control Room which will be conducted after successful performance of the three special tests.

The power ascension program includes management assessment periods, each of which end in an Assessment Point, during which management can systematically review earlier performance evaluation results, assure itself that corrective actions taken as a result of performance evaluations have been effective, and determine that the plant and its staff are ready to proceed beyond each designated Assessment Point in the power ascension process. These periods will also be used to conduct required training of recently licensed Reactor Operators. The process for conducting performance evaluations of PNPS personnel and equipment throughout each period between the Assessment Points and the process for performing management assessments of the results of those perfor-

mance evaluations at each Assessment Point are described in Section V.

In response to the NRC request in the August 27, 1986 letter on the subject of Confirmatory Action Letter (CAL) 86-10, Boston Edison has proposed three NRC approval points, each of which require oral approval from NRC Region I for continuation of the power ascension. These approval points are described in Section III.

Finally, Boston Edison has considered prior relevant nuclear industry experience with restart and power ascension programs. Boston Edison has considered the specific plant circumstances under which other restart and power ascension programs were developed and conducted to distinguish those features in other plants' programs which should apply to PNPS restart from those features which were plant-specific and should not apply.

B. Summary Description of Power Ascension

A sequence of power ascension steps and associated tests brings the plant from approach-to-criticality to 100% power. This sequence is depicted in Figures 1 and 2. Figure 1 is a diagram of the testing, training, assessment and power ascension steps. A portable auxiliary boiler is being used to perform HPCI and RCIC testing at 150 psig prior to beginning power ascension. Tests satisfactorily completed using the auxiliary boiler will be deleted from the initial power ascension sequence depicted on

page 1 of Figure 1. Figure 2 is a plot of approximate power levels during the specified tests, training and assessments.

As illustrated in Figure 1, the PNPS reactor will be taken critical following Boston Edison and NRC approval of restart. As the plant is slowly heated and pressure is increasing, a number of routine startup tests and checks of plant equipment are conducted. Some of these tests, instrument calibrations, and checks are indicated on Figure 1.

During initial reactor heatup, the main steam isolation valves will be tested to verify that they open with normal differential pressure across the valves. This test is designed to verify correction of one of the plant hardware problems addressed in CAL 86-10.

Beginning with initial reactor heatup and continuing throughout the power ascension, Boston Edison will monitor the low pressure portions of the Residual Heat Removal system for inleakage from the reactor. This action addresses a second hardware problem from CAL 86-10.

At approximately 27% reactor power, Boston Edison will initiate a normal shutdown, shift the mode switch to startup and decrease reactor pressure to about 800 psig to confirm that the main steam isolation valves remain open during reactor depressurization after the mode switch is shifted from "Run" to "Startup". This test addresses the third problem addressed in CAL 86-10.

Following successful completion of the above testing, Boston

Edison will increase power to approximately 35% to build in sufficient decay heat to conduct the required shutdown-from-outside-the-Control Room test. This period of operation will also be used for operator training and management assessment of performance prior to conducting the required shutdown-from-outside-the-Control Room test.

Following recovery from the shutdown test, the scram setpoint will be raised to the 70% power level and reactor power will be gradually increased to approximately 50% as normal testing and calibration are conducted. Boston Edison management will assess performance of the plant and personnel at this point before permitting the power ascension to continue above the 50% power level.

The scram setpoint will then be raised to 95% power to permit the reactor to be brought to approximately 75% power. During this time, reactor engineering tests comparable to those performed at 50% power, as well as turbine valve tests and main steam isolation valve tests, will be conducted. Boston Edison management will assess the performance of the plant and personnel at this point before permitting the power ascension to continue above the 75% power level.

The scram setpoint will then be raised to its normal 120% level and the reactor will be brought to 100% power. Routine reactor engineering tests will be conducted at this power level to complete the power ascension process. Boston Edison management will assess the performance of the plant and personnel con-

firming satisfactory completion of the Power Ascension Program and the effectiveness of the programs, plans and actions for continued operation.

This sequence of restart tests for startup from RFO-7 is documented in PNPS Nuclear Operations Department Temporary Procedure 87-114. Major elements of the procedure are the summary description, the cross-reference of the tests, and the Power Ascension Test Checklist. The summary description of the tests is intended for general information. The specific details or criteria for actually conducting the listed tests will be incorporated in the individual PNPS operating procedures which are referenced in Temporary Procedure 87-114. The Power Ascension Test Checklist will be used to document acceptable completion of a test.

Figure 1, the Power Ascension Plan, will be used by the Startup Test Manager to develop daily testing and power ascension schedules, which will be approved by the Operations Section Manager. In addition, a plan of the day will be approved by the Station Manager that will co-ordinate the power ascension testing with the testing required by the Master Surveillance Tracking Program.

III. Management Assessment Points and NRC Approval Points

Boston Edison will assess personnel and equipment performance at several points during the power ascension. The process for assessment prior to initial criticality will have been completed prior to requesting restart and is discussed in Section V.A. The sources of Boston Edison Assessment Point and NRC approval point requirements, the actual Assessment Points, and the proposed Approval Points for power ascension are described in this section.

A. Sources of Assessment Point and Approval Point Requirements

In the course of its self-assessment, Boston Edison's senior nuclear management has identified a need for a number of predetermined Assessment Points for review of personnel and equipment operational performance. These Assessment Points occur at logical intervals in the power ascension sequence. Senior management approval will be obtained before power ascension will be permitted to continue beyond each Boston Edison management assessment point.

The NRC, in its August 27, 1986 letter, requested that the PNPS power ascension program include "hold points at appropriate stages such as criticality, completion of mode switch testing, and at specific milestones during ascension to full power." In response to this request, Boston Edison has proposed three NRC

approval points which would require oral authorization from NRC Region I before PNPS can continue power ascension.

B. Description of Power Ascension Assessment Points

Four Boston Edison Assessment Points are planned during the Power Ascension Program. Examples of the types of activities that will be conducted during each of the evaluation periods are described. At each Assessment Point, management will review results of observations, performance evaluations, and any corrective actions taken for personnel, equipment and procedures during the preceding period of power ascension. Further, management will identify additional corrective actions as required, and will confirm readiness to proceed with the next period of power ascension.

Assessment Point 1

The first Assessment Point will be after recovery from testing to confirm that the main steam isolation valves remain open during reactor depressurization after the reactor mode switch is shifted from "Run" to "Startup" and with the plant conditions established for commencing the shutdown-from-outside-the-Control Room test. Assessment Point 1 appears on page 2 of Figure 1.

During the period between initial criticality and Assessment Point 1, personnel and equipment performance will be evaluated. The types of activities and tests that will be undertaken during this period include the following:

- o HPCI and RCIC testing at 150 psig and at rated pressure, requiring coordination of activities by the operations, maintenance and radiological controls personnel; and

- o Reactor vessel heat-up, and the bringing of equipment on line to support increased power, including the conduct of operations, maintenance, technical and radiological control duties.

Evaluations of activities such as those described above will enable management to assess the performance of personnel in a variety of disciplines, as well as the working interface and coordination between the disciplines.

Management will conduct this assessment and determine readiness to proceed with power ascension while at a power level between 20% and 35%. This range was selected for calibration of the nuclear instrumentation and to build up sufficient decay heat to properly perform the shutdown-from-outside-the-Control Room test. The "Management Assessment" period is depicted on page 2 of Figure 1. During this assessment period, newly licensed Reactor Operators (individuals receiving licenses after May 1987) on each operating crew are scheduled to receive 40 hours of operating experience. Depending on the shift rotation schedule, this assessment period is scheduled to be 8 to 12 days in duration.

Assessment Point 2

The second Assessment Point will be after the reactor engineering tests at nominal 50% reactor power and prior to moving the scram setpoint above the 70% power level. Assessment Point 2 appears on page 3 of Figure 1.

Between Assessment Points 1 and 2, a number of tests and plant activities, such as bringing equipment on line to support increasing power, will provide an opportunity for evaluation of equipment and personnel performance. The types of activities and tests that will be undertaken during this period include the following:

- o Shutdown-from-outside-the-Control Room test, requiring shutdown of the reactor from the dedicated alternate shutdown panels in the Process Buildings while maintaining a qualified crew of operators in the Control Room.

- o Condensate demineralizer operation, as necessary, which requires:

  (1) plant chemistry personnel to sample, analyze and provide water conductivity status; and

  (2) placing the additional condensate demineralizer units in service.

The "Management Assessment" period immediately prior to Assessment Point 2 is shown on Page 3 of Figure 1. This assessment period is scheduled to be 8 to 12 days in duration to permit newly licensed Reactor Operators on each operating crew to receive 40 hours of operating experience.

Assessment Point 3

Boston Edison has selected a third Assessment Point after completion of the reactor engineering tests at nominal 75% power level and prior to movement of the scram setpoint above 95% power. Assessment Point 3 is depicted on page 3 of Figure 1.

Many of the plant activities between Assessment Points 2 and 3 are virtually identical to those between Points 1 and 2 because the reactor engineering tests conducted at the 75% power level are largely a repetition of those conducted at the 50% power level. During this period, additional plant equipment will be placed in service as necessary to support the higher power levels. The types of activities that will be conducted during this period include the following:

- Placing the additional condensate demineralizer units in service;
- Operation of the Augmented Offgas System;
- Placing the third reactor feedwater pump in service; and
- Routine surveillances and preventive maintenance, chemistry analyses, and radiological surveys.

The "Management Assessment" period immediately prior to Assessment Point 3 is depicted on page 3 of Figure 1. During this period, newly licensed Reactor Operators on each operating crew are scheduled to receive 40 hours of operating experience. Depending on the shift rotation schedule, this assessment period is scheduled to be 8 to 12 days in duration.

Assessment Point 4

At nominal 100% power, the final series of reactor engineering tests and calibrations in the power ascension program will be performed. Evaluations conducted between Assessment Points 3 and 4 will largely focus on routine operating activities such as coordination of surveillances, anticipation and correction of problems, and the conduct of routine and preventive maintenance. In addition, operating activities such as recirculation flow adjustments and control rod manipulations to counteract xenon buildup and achieve 100% power provide an opportunity to evaluate the coordination between operations personnel and reactor engineers.

Results from these reactor engineering tests, as well as the additional performance evaluations, will be assessed by Boston Edison senior management at the fourth and final Assessment Point. Boston Edison management will assess the performance of the plant and personnel confirming satisfactory completion of the Power Ascension Program and the effectiveness of the programs, plans and actions for continued operation.

C. Description of Approval Points

As shown on Figure 2, Boston Edison proposes three NRC Approval Points.

The first NRC Approval Point is immediately prior to criticality. In accordance with CAL 86-10, dated April 12, 1986, NRC Region I authorization is required for PNPS restart.

The second NRC Approval Point is proposed after recovery from testing to verify that the main steam isolation valves remain open during reactor depressurization after the reactor mode switch is shifted from "Run" to "Startup" and with the plant conditions established for commencing the shutdown-from-outside-the-Control Room test. The August 27, 1986 NRC letter referencing CAL 86-10 indicates that completion of this testing is an appropriate stage for NRC approval to continue power ascension. Accordingly, Boston Edison proposes this as the second NRC Approval Point.

The third NRC Approval Point prior to full power operation is proposed after completion of the reactor engineering tests at nominal 75% power level and prior to movement of the scram setpoint above the 95% level. At this point, results from the reactor engineering tests and operator training at the 50% and 75% power levels can be reviewed to confirm readiness to complete power ascension.

IV. Startup Organization

The PNPS startup organization for return to operation from RFO-7 is comprised of four elements as follows:

(1) the Operations Section;

(2) the post-refueling/modification outage test organization;

(3) the Nuclear Organization support for operations; and

(4) the oversight and assessment team.

The first three elements are the normal line organizations that would support restart from any complex and extended PNPS outage. The fourth element is an expansion of Boston Edison's management oversight processes to increase observation and evaluation of major evolutions during power ascension, to conduct periodic management assessments of evaluations performed throughout this period, and to confirm readiness to proceed.

A. Operations Section

The Operations Section is the normal line organization for restart from an outage such as RFO-7. Plant startup from any protracted and complex outage requires that additional people be available on shift to properly execute both the routine and outage-specific tests, as well as respond to operational problems that may occur after a long shutdown. In recognition of these factors, Boston Edison has elected to utilize a four-shift rota-

tion for the operators. The four-shift rotation will enable assignment of the necessary number of operators, without incurring excessive and unscheduled overtime. The four-shift rotation will also enable assignment of an experienced SRO, designated as the "Assistant Watch Engineer" to provide field oversight and on-the-job training for the equipment operators.

The actual operating organization as depicted in Figure 3 consists of the Operations Section Manager and, in descending order, his Chief Operating Engineer, the Watch Engineers for each shift, and the shift operating crews. They report to the Station Manager.

At the completion of the power ascension program and when a sufficient number of Reactor Operators are fully qualified, a transition to a six section watchbill will occur. This six section watchbill is intended to provide a nominal 40 hour work week for each operating crew and address watchstanding, training and extended absence coverage.

B. Post-Refueling/Modification Outage Test Organization

Boston Edison is following its normal practice to use a post-refueling/modification outage test organization for restart from a complex outage. The shaded boxes on the chart in Figure 3 show this organization. Boston Edison's experience is that this test organization's support to the Operations Section has contributed to the successful control of startup from an extended

and complex outage. The Technical Section Manager is the Startup Test Manager during restart and power ascension. As such, he is responsible for directing and coordinating the efforts of the Shift Test Coordinators, Reactor Engineers, Computer Engineers, Test Engineers, Turbine Test Engineers, and Test and Turnover personnel, for preparation of daily power ascension test schedules, and for independent review of test results.

C. Nuclear Organization Support for Operations

The restart from RFO-7 will be achieved with the normal plant support functions, e.g., Nuclear Engineering, Quality Assurance/Quality Control, Security, Fire Protection, Planning/Scheduling and Cost Control, Technical Support, and other nuclear organization groups. Due to the complexity of this outage, there will be a Shift Maintenance Representative, as shown on Figure 3, assigned to provide 24 hour coverage for maintenance coordination.

D. Oversight and Assessment Team

During restart and power ascension from RFO-7, an additional organization will provide oversight of power ascension. A description of the oversight and assessment team is provided in Section V. B.

V. Management Assessment Process

The management assessment process during restart and power ascension will focus on management, operational, plant and equipment performance. Senior Boston Edison Nuclear Organization managers will personally observe major evolutions during restart and power ascension and will assess personnel and equipment performance at each of the four designated Assessment Points to confirm readiness for continued operation.

As used in this program, the following terms are defined:

evaluation — processes used by peer evaluators, line management and individual members of the oversight and assessment team throughout the Power Ascension Program to observe specific activities and evaluate the performance.

assessment — processes used by the line management or oversight and assessment team during the designated assessment period prior to each Assessment Point to review the results of prior PNPS activities, including prior performance evaluations, and to decide whether the personnel and plant are ready for continued operation.

A. Readiness Assessment for Initial Criticality

The readiness assessment process for initial criticality will consist of five major elements. First, the prerequisites for criticality and the responsible individual for each prerequisite will be identified. As the second step, the responsible individuals and their line management will certify that the restart prerequisites are closed. Then senior management will

review prerequisite closure to assure that the actions taken fully address the identified issues and that the items are properly closed. Fourth, senior management will conduct an assessment of the effectiveness of the programs, plans and actions for restart. Senior management will then decide whether to recommend restart to the Boston Edison Board of Directors. Finally, after Boston Edison Board approval, NRC approval to restart will be requested.

Restart prerequisites for criticality include the following:

(1) the Restart Plan, including:

(a) the Restart Plan Appendix 10 Restart Regulatory Responses;

(b) the restart actions in the Material Condition Improvement Action Plan (MCIAP);

(c) the restart actions in the Radiological Action Plan (RAP); and

(2) the Plant Operating Condition Change Checklist Number 6 for pre-critical tests and plant startup, including a review of plant systems status by the Systems Group and approval of the checklist by Boston Edison's Operations Review Committee.

The seven bases for the Boston Edison management assessment of readiness for criticality and restart as described in the Restart Plan, Chapter V, are as follows:

(1) Management will have executed its plans for RFO-7 work.

(2) Staffing levels will be adequate to support safe and reliable restart and continued operation, and a plan for orderly transition from the restart organization to a long term organization will be established.

(3) Pertinent performance indicator trends for RFO-7 work, including backlog work, will show that management control has been established.

(4) Self-assessments will have been performed and action plans established, including comprehensive action plans addressing material condition (including maintenance and radiological controls), to assure that management control will continue.

(5) Regulatory issues will have been addressed.

(6) Systems group reviews will have been completed and restart actions identified from those reviews will have been closed or specifically scheduled in the approach to startup.

(7) The RFO-7 Power Ascension Program, including NRC hold points, will have been established.

The readiness assessment process has been structured through the use of the restart prerequisites and bases for assessment to assure the integrity of the results.

B. Oversight and Assessment of Power Ascension

Six senior level managers in the Nuclear Organization will serve as the oversight and assessment team during power ascension. These senior managers will observe personnel and equipment performance during the Power Ascension Program and will perform assessments at each of the Assessment Points to confirm readiness for continued operation. The team members are:

(1) the Senior Vice President - Nuclear;

(2) the Vice President - Nuclear Engineering and Quality Assurance;

(3) the Executive Assistant to the Senior Vice President - Nuclear;

(4) the Director of Planning and Restart;

(5) the Nuclear Engineering Manager; and

(6) the Quality Assurance Manager.

Direct support to the oversight and assessment team in performing assessments of plant and personnel performance will be provided by peer evaluators. In the area of operations, for example, individuals assigned as peer evaluators will have current or previous BWR Senior Reactor Operator licenses or certifications. These individuals will be assigned to shift rotation to act as operations observers and report the results of their observations and evaluations to the oversight and assessment team.

Other peer evaluators will be assigned to support observations in areas such as radiological controls (health physics) and maintenance to support the oversight and assessment team as necessary. These peer evaluators will observe specific plant evolutions or support activities of interest and report the results of their observations and evaluations to the oversight and assessment team. This performance evaluation process is designed to retain the flexibility to respond to changing conditions. The number and experience of the peer evaluators will be adjusted by the oversight and assessment team based on the evolution to be observed and the trend in observations.

C. Performance Assessments at Assessment Points

The process for performance assessment by the oversight and assessment team at each of the four Assessment Points during power ascension will consist of the following five elements:

(1) performance standards to guide the evaluations;

(2) guidelines for follow-up and feedback of lessons learned;

(3) training on the standards and guidelines for follow-up and feedback;

(4) performance evaluations and assessments by line management; and

(5) performance evaluations by the oversight and assessment team including peer evaluations.

Performance standards are under development for each of the disciplines that will be evaluated. These standards will be used by the evaluators as a basis for comparison of actual performance to predetermined goals to ensure consistency throughout the evaluation and assessment process. Guidelines for follow-up and feedback of lessons learned will be developed, and will cover the criteria for determining the immediacy of feedback as well as the lines of communication for feedback.

The standards now being developed address the following types of concerns:

(1) Is plant equipment operating safely and reliably?

(2) Are assessment and feedback of lessons learned effective?

(3) Is the organization functioning as a team?

(4) Is management oversight effective and is management knowledgeable about current plant and organizational conditions?

(5) Are problems identified, addressed and resolved in a timely and appropriate manner?

(6) Has the staff provided proper oversight of operations activities to ensure safe and reliable operation?

(7) Do the operators receive adequate and timely technical support?

(8) Is the interface between the maintenance, radiological controls, and operations personnel working properly to ensure adequate maintenance support for plant evolutions?

(9) Have the management tools such as procedures, computer programs, etc., provided the guidance and information necessary to support plant evolutions?

(10) Are off-normal conditions anticipated, recognized and resolved in a timely and appropriate manner?

These standards and guidelines, as well as the results of the evaluations, will be available at the PNPS site.

The pre-restart training of the individuals involved in this evaluation and assessment process will include a combination of selected activities that will be dependent upon the individual's assignment/area of expertise. These activities will include the following:

- Formal Classroom Instruction
- Simulator Familiarization/Lab Exercises
- On-site Field Activities (e.g. Surveillance Testing, Equipment Maintenance/Testing, System Walkthroughs, etc.)

This training and critique process will familiarize these individuals with the applicable standards and guidelines to as-

sure a consistent basis for the evaluations. The specific plant evaluations generated during this training program, will provide Boston Edison senior management with an additional mechanism for assessing the readiness of plant personnel for initial criticality and power ascension. During power ascension, any new individuals assigned to this evaluation process will also receive training on these standards and guidelines.

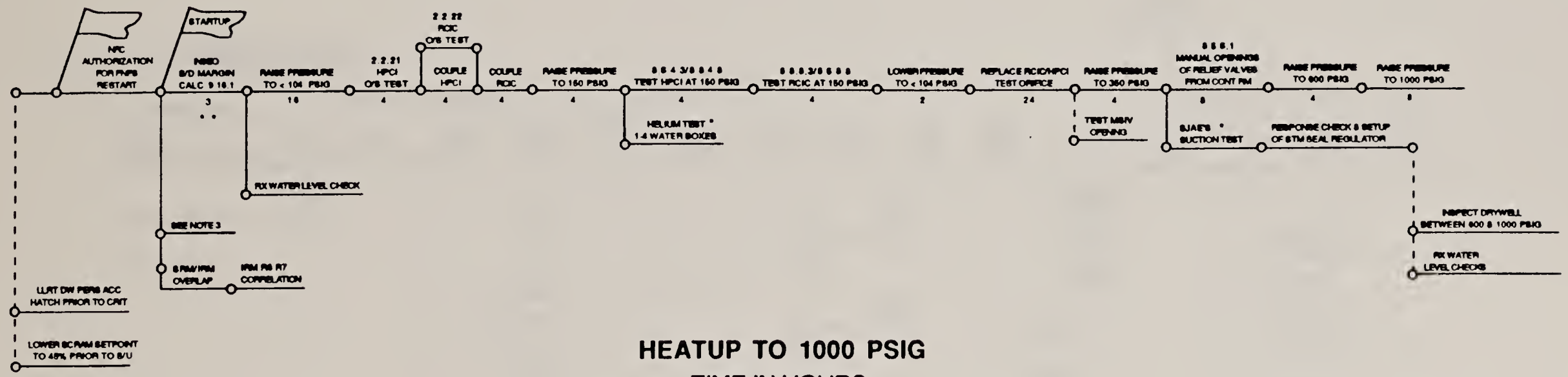
Performance evaluations during restart and power ascension will be conducted on two parallel tracks. Line management will evaluate performance as part of their normal management functions, including expansion of the recently implemented PNPS Management Monitoring Program. The oversight and assessment team will perform independent evaluations with input from peer evaluators.

During the assessment period immediately prior to each Assessment Point, the oversight and assessment team will review the results of the evaluations performed thus far. These assessments are designed to confirm satisfactory personnel and equipment performance to that point in the Power Ascension Program and the readiness of the personnel and plant for continued safe and reliable operation.

GLOSSARY OF ACRONYMS

ASP	ALTERNATE SHUTDOWN PANEL
ACC	ACCESS
AWE	ASSISTANT WATCH ENGINEER
APRM	AVERAGE POWER RANGE MONITOR
CAL	CALIBRATION
CALC	CALCULATION
CHAMB	CHAMBER
CIV	COMBINED/INTERCEPT VALVE
COMP	COMPUTER
CRD	CONTROL ROD DRIVE
CRIT	CRITICALITY
CTP	CORE THERMAL POWER
DET	DETECTION
DW	DRYWELL
ENG	ENGINEERING
EPIC	EMERGENCY AND PLANT INFORMATION COMPUTER
EPR	ELECTRIC PRESSURE REGULATOR
FUNCT	FUNCTIONAL
FW	FEEDWATER
GEN	GENERATOR
HPCI	HIGH PRESSURE COOLANT INJECTION
INSEQ	INSEQUENCE
IRM	INTERMEDIATE RANGE MONITOR
LLRT	LOCAL LEAK RATE TEST
LPRM	LOCAL POWER RANGE MONITOR
LSTG	LARGE STEAM TURBINE GENERATOR
MGMT	MANAGEMENT
MSIV	MAIN STEAM ISOLATION VALVE
NRC	NUCLEAR REGULATORY COMMISSION
O/S	OVERSPEED
OD	ON DEMAND
OPER	OPERATING PROCEDURE
PCIOMR	PRECONDITIONING INTERIM OPERATING MANAGEMENT RECOMMENDATION
PERS	PERSONNEL
PNPS	PILGRIM NUCLEAR POWER STATION
RCIC	REACTOR CORE ISOLATION COOLING
REG	REGULATOR
RM	ROOM
Rx	REACTOR
S/D	SHUTDOWN
S/U	STARTUP
SDOCR	SHUTDOWN OUTSIDE CONTROL ROOM
SJAE	STEAM JET AIR EJECTOR
SRM	STARTUP RANGE MONITOR
STM	STEAM
SV	STOP VALVE
TP	TEMPORARY PROCEDURE
TEMP	TEMPERATURE
TIP	TRAVERSING INCORE PROBE
TSI	TURBINE SUPERVISORY INSTRUMENTATION
TURB	TURBINE

POWER ASCENSION PLAN



HEATUP TO 1000 PSIG

TIME IN HOURS

NOTE:

1. HPCI & RCIC TESTING SATISFACTORILY COMPLETED WITH AUXILIARY BOILER MAY BE DELETED.
2. THIS IS A PLAN FROM WHICH DAILY SCHEDULES WILL BE DEVELOPED. THESE DAILY SCHEDULES WILL TAKE INTO CONSIDERATION PLANT AND EQUIPMENT STATUS.
3. MONITOR RHR LOW PRESSURE IN-SYSTEM LEAKAGE FROM PRESSURIZATION THROUGHOUT POWER ASCENSION.

* NOT A MANDATED TEST

** THIS MAY NOT BE PERFORMED IF SHUTDOWN MARGIN HAS PREVIOUSLY BEEN DEMONSTRATED.

PILGRIM NUCLEAR POWER STATION
POWER ASCENSION PLAN
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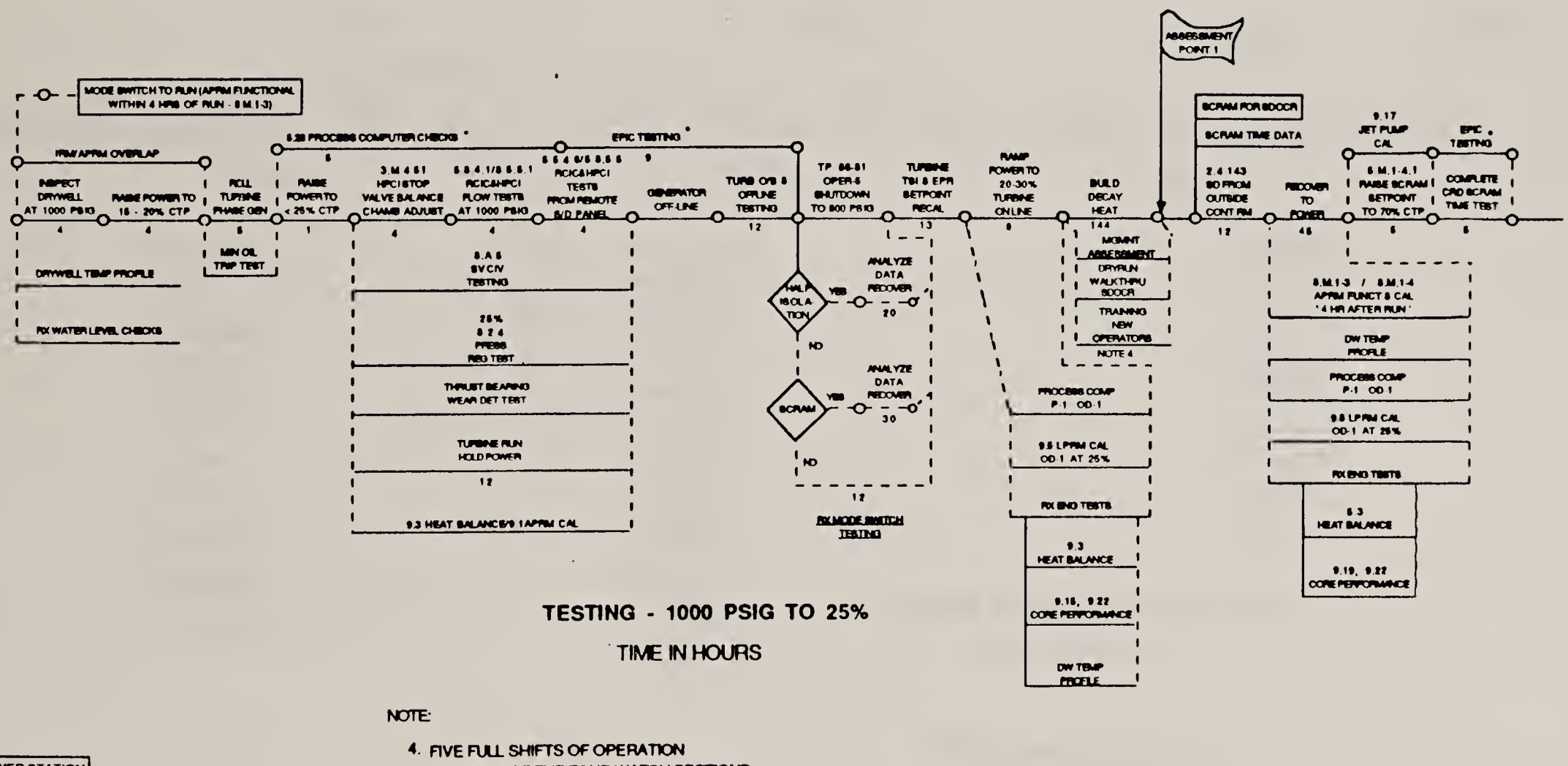
FIGURE 1

POWER ASCENSION PLAN



TESTING - 1000 PSIG TO 25%

TIME IN HOURS

NOTE:

4. FIVE FULL SHIFTS OF OPERATION FOR EACH OF THE FOUR WATCH SECTIONS.

* NOT A MANDATED TEST

PILGRIM NUCLEAR POWER STATION
POWER ASCENSION PLAN
PAGE 2 OF 3

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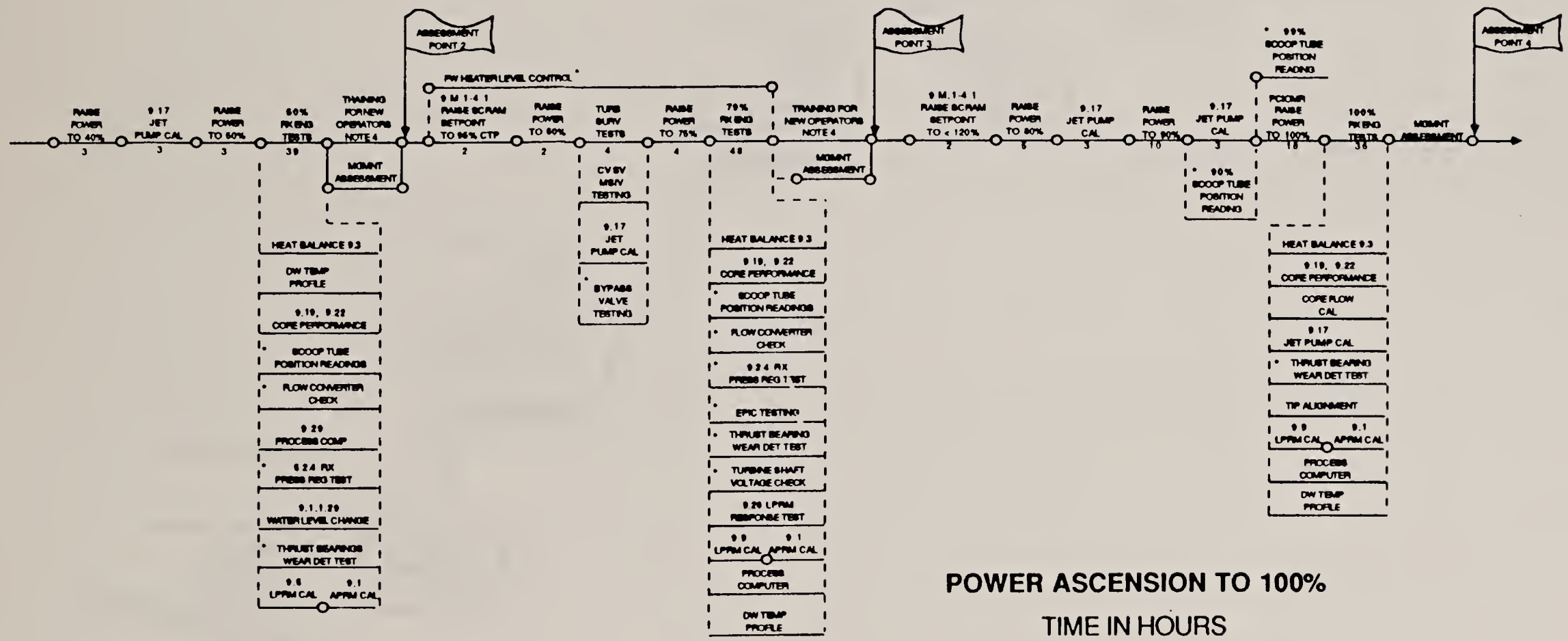
FIGURE 1

POWER ASCENSION PLAN



POWER ASCENSION TO 100%

TIME IN HOURS

NOTE:
4. FIVE FULL SHIFTS OF OPERATION FOR EACH OF THE FOUR WATCH SECTIONS.
* NOT A MANDATED TEST

PILGRIM NUCLEAR POWER STATION
POWER ASCENSION PLAN
PAGE 3 OF 3

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FIGURE 1

POWER ASCENSION PLAN

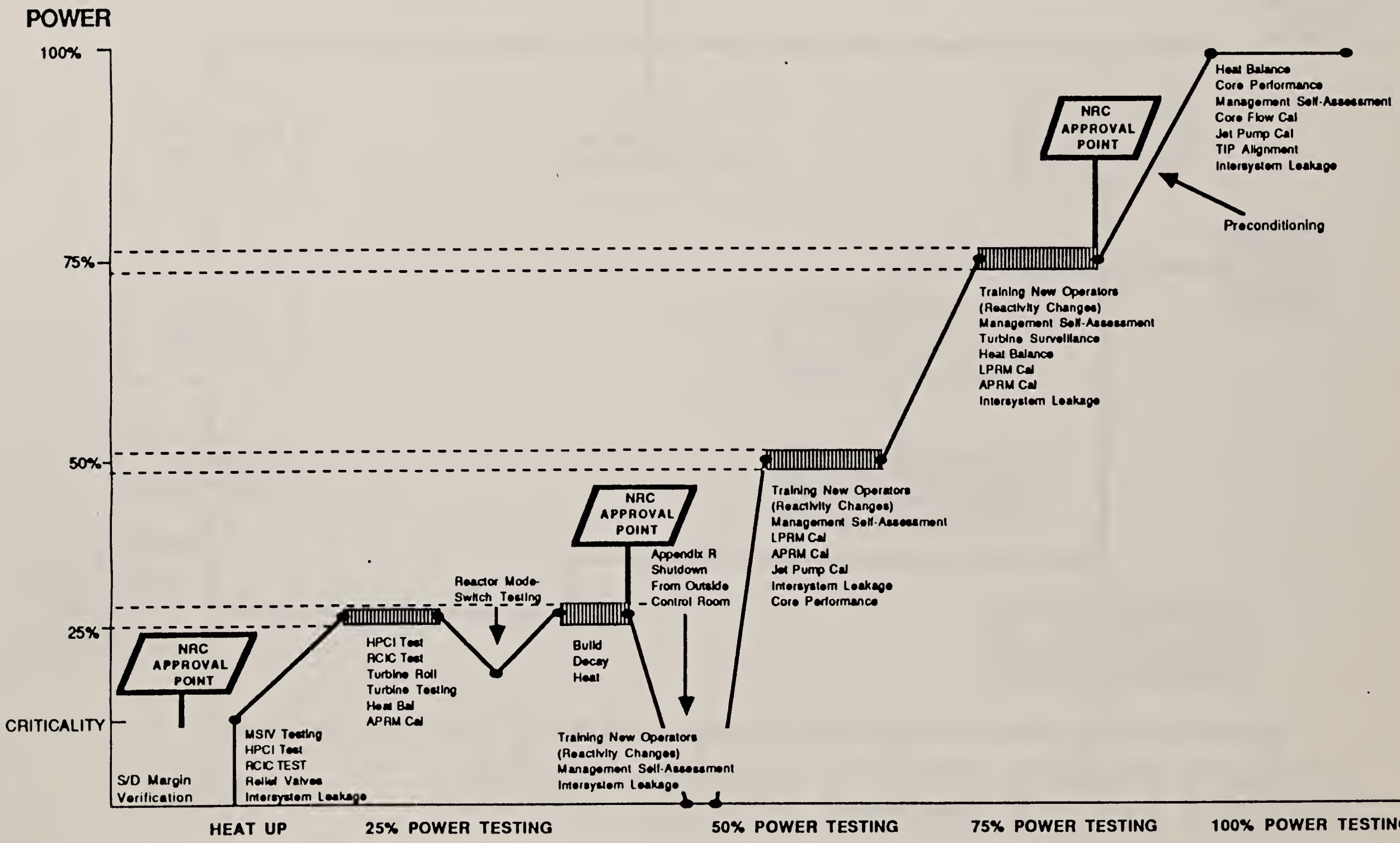

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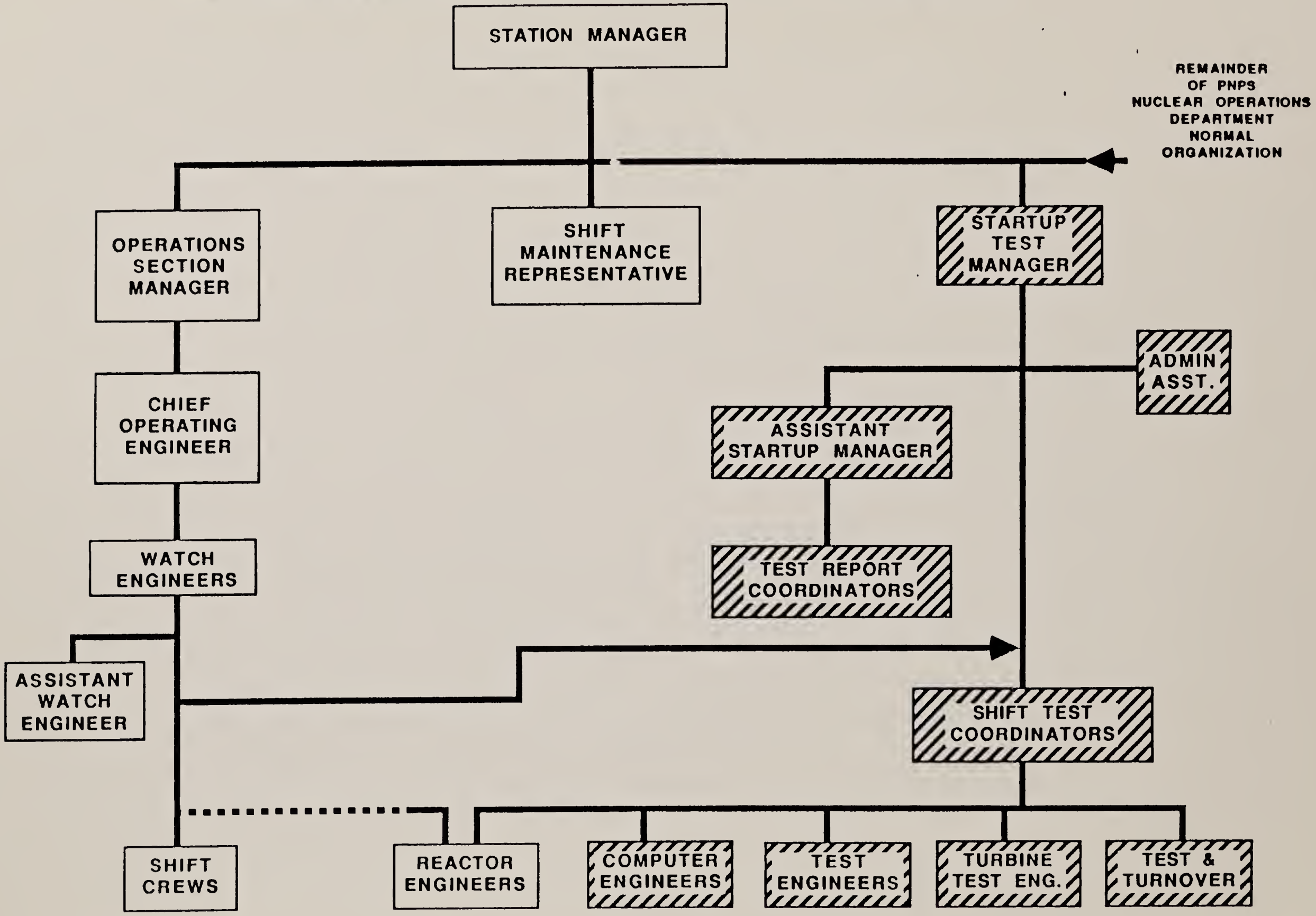
Figure 2

Figure 2

PILGRIM NUCLEAR POWER STATION STARTUP ORGANIZATION



NOTE: INDICATES PERSONNEL ASSIGNMENT FOR POST-OUTAGE TESTING

Figure 3 . . .

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APPENDIX G

APPENDIX H

APPENDIX G

Inspection Activities

(January 1, 1986 - August 31, 1988)

Pilgrim Nuclear Power Station

APPENDIX G

Inspection Activities (1/1/86 - 8/31/88)

Pilgrim Nuclear Power Station

Report Number	Inspection Dates	Inspection Hours	Areas Inspected
86-01	01/01/86 - 02/17/86	128	Routine Resident Inspection
86-02	01/13/86 - 01/17/86	117	Radiological Controls Program/Followup Inspection to 85-32
86-03	01/22/86 - 01/24/86	40	Emergency Preparedness Program
86-04	01/02/86	8	Inspection of radioactive waste shipment from Pilgrim by a representative of the South Carolina Department of Health and Environmental Control
86-05	--	--	Cancelled
86-06	02/18/86 - 03/07/86	962	Diagnostic special team inspection of overall plant operations
86-07	03/09/86 - 04/28/86	266	Routine Resident Inspection
86-08	03/17/86 - 03/21/86	34	Security and Safeguards
86-09	04/28/86 - 05/02/86	51	Radiological Environmental Monitoring Program
86-10	03/24/86 - 03/27/86	40	Radioactive Waste Packaging and Transportation Program
86-11	05/12/86 - 05/16/86	40	Corrective maintenance on the Main Steam Isolation Valves, Residual Heat Removal system valves and installation of high density spent fuel pool storage racks

Appendix G - Inspection Activities

Report Number	Inspection Dates	Inspection Hours	Areas Inspected
86-12	03/24/86 - 03/28/86	57	Plant modifications involving analog trip system
86-13	04/03/86	15	Emergency Preparedness Program
86-14	04/28/86 - 06/02/86	225	Routine Resident Inspection
86-15	05/05/86 - 05/08/86	--	Reactor Operator Examination
86-16	04/14/86 - 04/17/86	28	Radiological controls program associated with post accident sampling and analysis
86-17	04/12/86 - 04/25/86	574	Augmented special safety team inspection on operational events
86-18	--	--	Cancelled
86-19	10/20/86 - 10/24/86	206	Special health physics inspection on upgraded radiation protection program
86-20	--	--	Cancelled
86-21	06/02/86 - 07/07/86	346	Routine Resident Inspection
86-22	06/12/86	22	Management Meeting
86-23	--	--	Cancelled
86-24	08/04/86 - 08/08/86	169	Quality Assurance and Quality Control overview - Equipment classification and vendor interface
86-25	07/08/86 - 08/04/86	350	Routine Resident Inspection

Appendix G - Inspection Activities

Report Number	Inspection Dates	Inspection Hours	Areas Inspected
86-26	--	--	Cancelled
86-27	08/04/86 - 08/08/86	43	Maintenance Program
86-28	08/04/86 - 08/08/86	20	Safeguards Program
86-29	08/05/86 - 09/08/86	231	Routine Resident Inspection
86-30	07/03/86	8	Management Meeting
86-31	09/08/86 - 09/12/86	60	Nuclear engineering program associated with seismic stress analysis of safety related piping
86-32	09/09/86	8	Management Meeting
86-33	09/30/86 - 10/03/86	34	Emergency Preparedness Program
86-34	09/16/86 - 10/20/86	248	Routine Resident Inspection
86-35	09/29/86 - 10/02/86	29	Radioactive Effluents Program
86-36	10/20/86 - 10/24/86	50	Fire Protection Program
86-37	10/21/86 - 11/24/86	275	Routine Resident Inspection
86-38	11/12/86 - 11/14/86	53	Special inspection of fire protection program
86-39	12/09/86 - 12/11/86	160	Annual emergency preparedness exercise
86-40	11/25/86 - 12/31/86	160	Routine Resident Inspection
86-41	11/24/86	8	Management Meeting
86-42	12/08/86 - 12/12/86	28	Security and Safeguards Program

Appendix G - Inspection Activities

Report Number	Inspection Dates	Inspection Hours	Areas Inspected
86-43	12/15/86 - 12/19/86	35	Maintenance program concurrent with outage management
86-44	12/17/86 - 12/19/86	28	Radiological Controls Program
86-45	09/03/86 - 11/07/86	--	Reactor operator requalification examination
87-01	01/05/87 - 01/09/87	64	Plant modifications involving reactor water level instrumentation system and reactor coolant hydrogen injection system
87-02	01/05/87 - 01/09/87	34	Surveillance program and local leak rate testing
87-03	01/01/87 - 02/20/87	228	Routine Resident Inspection
87-04	01/12/87 - 01/16/87	104	Surveillance/Maintenance Programs
87-05	01/12/87 - 01/16/87	33	Inservice Inspection and Surveillance Program
87-06	02/03/87 - 02/05/87	32	Nuclear Material Control and Accounting Program
87-07	01/20/87	--	Management Meeting to discuss fire protection program deficiencies and Appendix R status
87-08	02/02/87	--	Management Meeting to discuss plant status, licensee improvement programs, and Meeting 86-41 item status
87-09	02/09/87 - 02/13/87	27	DC electrical system maintenance and surveillance, and previous open item followup

Appendix G - Inspection Activities

Report Number	Inspection Dates	Inspection Hours	Areas Inspected
87-10	02/02/87 - 02/06/87	37	Snubber and safety relief valve maintenance and surveillance program
87-11	02/10/87 - 02/13/87	61	Outage radiological controls program
87-12	02/10/87 - 02/13/87	42	Maintenance Program, Organization, Staffing, and Implementation
87-13	02/10/87 - 02/13/87	29	Analog trip system, 10 CFR 50, Appendix R, and process computer modifications
87-14	02/24/87 - 02/27/87	79	Outage radiological controls program secondary water chemistry program, and PASS inspection followup
87-15	03/02/87 - 03/13/87	320	NDE Van
87-16	02/21/87 - 04/06/87	352	Routine Resident Inspection
87-17	03/13/87 - 03/20/87 04/07/87 - 04/10/87	65	Special inspection to follow-up a personnel contamination incident
87-18	04/07/87 - 05/18/87	348	Routine Resident Inspection
87-19	04/27/87 - 05/01/87	82	Outage Radiological Controls
87-20	04/27/87 - 05/01/87	80	Quality Assurance Program
87-21	05/11/87 - 05/15/87	44	Third diesel generator installation and HGA relay replacement program
87-22	05/04/87 - 05/15/87	248	10 CFR 50, Appendix R Team Inspection
87-23	05/01/87	--	Management Meeting to discuss Surveillance Program Inadequacies

Appendix G - Inspection Activities

Report Number	Inspection Dates	Inspection Hours	Areas Inspected
87-24	06/01/87 - 06/05/87	42	Non-licensed Staff Training Programs
87-25	05/26/87 - 05/29/87	--	Operator License Examinations
87-26	05/19/87 - 06/22/87	406	Routine Resident Inspection
87-27	06/23/87 - 08/03/87	414	Routine Resident Inspection
87-28	06/29/87	--	Management Meeting to discuss Outage Status and Licensee Improvement Programs
87-29	07/13/87 - 07/17/87	50	Outage Radiological Controls
87-30	07/13/87 - 07/17/87	101	Security program, security allegation followup and review of a degraded vital area barrier incident
87-31	07/20/87 - 07/24/87	40	Post modification test program
87-32	08/03/87 - 08/07/87 08/10/87 - 08/14/87 08/20/87	165	Modifications Program Team Inspection
87-33	08/03/87 - 08/07/87	36	Post Modification Test Program
87-34	08/04/87 - 09/14/87	325	Routine Resident Inspection
87-35	10/05/87 - 10/09/87	105	Radiological controls, organization and staffing; independent measurements; transportation activities; radiological effluents; and environment sampling program team inspection
87-36	08/17/87 - 08/21/87	114	Maintenance Program and MCIAP

Appendix G - Inspection Activities

Report Number	Inspection Dates	Inspection Hours	Areas Inspected
87-37	08/17/87 - 08/21/87 08/31/87 - 09/04/87	227	NRC Open Item Followup
87-38	08/31/87 - 09/04/87	80	Quality Assurance and Corrective Action Programs
87-39	08/31/87 - 09/04/87	36	Fire Protection Program
87-40	09/14/87 - 09/18/87	72	Radiological Controls Program
87-41	09/14/87 - 09/18/87	142	Surveillance program and post-modification testing
87-42	09/28/87 - 10/02/87	77	CAL 86-10 followup and MCIAP review
87-43	11/02/87 - 11/05/87	77	Radiological controls program, RIP order review and closeout
87-44	09/15/87 - 09/18/87	56	Security Program Status
87-45	09/15/87 - 10/26/87	482	Routine Resident Inspection
87-46	09/21/87 - 09/25/87 10/05/87 - 10/09/87	168	NRC Open Item Followup
87-47	10/05/87 - 10/09/87	118	Procurement management, hydrogen water chemistry modifications and the local leak rate test program
87-48	11/03/87 - 11/05/87	20	Emergency Preparedness Program
87-49	11/02/87 - 11/06/87	30	Radiological Controls Program
87-50	10/27/87 - 12/06/87	536	Routine Resident Inspection
87-51	11/02/87 - 11/06/87	39	Power Ascension Testing and Modification Training Programs

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Report Number	Inspection Dates	Inspection Hours	Areas Inspected
87-52	Cancelled		
87-53	11/16/87 - 11/20/87	380	Augmented Team Inspection in response to a Loss of Offsite Power Event
87-54	12/08/87 - 12/10/87	90	Annual Emergency Preparedness Exercise
87-55	11/30/87 - 12/04/87	37	NRC Open Item Followup
87-56	12/07/87 - 12/11/87	--	Operator License Examinations
87-57	12/07/87 - 01/19/88	349	Routine Resident Inspection
87-58	12/20/87 - 12/23/87	31	Containment Integrated Leak Rate Testing
88-01	01/25/88 - 01/19/88	40	Radiological Controls Program
88-02	01/24/88 - 01/30/88	95	MCIAP Review
88-03	01/25/88 - 01/29/88	76	NRC Open Item Followup, Power Ascension Program, and Oversight and Assessment Program
88-04	Cancelled		
88-05	01/25/88 - 01/28/88	52	Emergency Preparedness Program
88-06	01/25/88 - 01/28/88	52	Security Program
88-07	01/20/88 -03/05/88	575	Routine Resident Inspection
88-08	02/01/88 - 02/05/88	180	Special Electrical Team Inspection
88-09	02/24/88 - 02/25/88	14	Emergency Preparedness followup to an Unusual Event

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Report Number	Inspection Dates	Inspection Hours	Areas Inspected
88-10	02/24/88	--	Management Meeting to discuss the licensee's Restart Readiness Self-Assessment Process
88-11	03/14/88 - 03/18/88	240	Emergency Operating Procedures Team Inspection
88-12	03/05/88 - 04/10/88	348	Routine Resident Inspection
88-13	04/11/88 - 04/15/88	88	NRC Open Item Followup
88-14	04/04/88 - 05/06/88	63	Power Ascension Test Program
88-15	04/04/88 - 04/08/88	34	Radioactive Waste Processing Systems
88-16	04/11/88 - 04/15/88	77	Security Program
88-17	04/25/88 - 05/06/88	372	Maintenance Team Inspection
88-18	04/25/88 - 05/06/88	88	Security Management Effectiveness
88-19	04/11/88 - 05/31/88	427	Routine Resident Inspection
88-20	05/02/88 - 05/06/88	54	Mark I Containment Long-Term Program (TI 2500/85)
88-21	08/08/88 - 08/24/88	1103	Integrated Assessment Team Inspection
88-22	05/23/88 - 05/27/88	83	Radiation Protection Inspection
88-23	06/20/88 - 06/30/88	147	Maintenance and engineering areas to review response to IN 86-03 and IN 86-53 (Limitorque Valves)
88-24	05/31/88 - 06/09/88	70	Followup on previous open items
88-25	06/01/88 - 07/17/88	328	Routine Resident Inspection

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Report Number	Inspection Dates	Inspection Hours	Areas Inspected
88-26	06/27/88	4	Management Meeting
88-27	07/18/88 - 08/28/88	334	Routine Resident Inspection and Power Ascension Test Program
88-28	07/18/88 - 07/21/88	27	Emergency Preparedness
88-29	08/18/88 - 08/20/88	40	Independent measurements of contaminated soil stored onsite and of the offsite Laydown Area

APPENDIX H

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Management Meeting and Plant Tour Summary

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Date	Sponsor	Topic
05/19/86	NRC	Management Meeting at Region I to discuss licensee response to Confirmatory Action Letter (CAL) 86-10 (IR 86-14)
06/12/86	NRC	Management Meeting at Region I to discuss licensee corrective action and improvement programs, including responses to CAL 86-10 (IR 86-22)
07/10/86	Congressional Staff	Members of the Congressional Staffs of United States Senator Kennedy, Senator Kerry, and Congressman Studds met onsite with the Resident Inspectors to discuss NRC activities (IR 86-25)
07/15/86	NRC	NRC Commissioner Asselstine and the Regional Administrator toured the plant and attended a licensee presentation
07/23/86	Plymouth Chamber of Commerce	The Senior Resident Inspector met with the Board of Directors of the Plymouth Chamber of Commerce to discuss NRC activities at Pilgrim (IR 86-25)
07/30/86	NRC	Management Meeting at Region I to discuss licensee management program improvements and outage plans (IR 86-30)
09/09/86	NRC	Management Meeting in Plymouth, Massachusetts to discuss plant status, licensee management and SALP improvements (IR 86-32)

Appendix H - Management Meeting and
Plant Tour Summary

Date	Sponsor	Topic
11/24/86	NRC	Management Meeting in Plymouth, Massachusetts to discuss licensee program improvements and outage status
12/17/86	Massachusetts Legislature	The Region I Administrator addressed a hearing held by the Joing Committee on Energy for the Commonwealth of Massachusetts
01/20/87	NRC	Management Meeting at Region I to discuss Fire Protection Program deficiencies and Appendix R Program status (IR 87-07)
02/02/87	NRC	Management Meeting at Plymouth, Massachusetts to discuss the status of licensee improvement programs (IR 87-08)
02/03/87	Massachusetts Secretary of Energy	NRC Region I Administrator and other Region I Managers met in Boston, Massachusetts with several Commonwealth Administrators to discuss NRC activities regarding Pilgrim
03/09/87	Massachusetts Legislature	NRC Region I Administrator and other members of the staff appeared in Boston, Massachusetts before the Massachusetts Joint Committee on the Investigation and Study of the Pilgrim Station at Plymouth (IR 87-16)
03/10/87	NRC	NRC Chairman Zech toured Pilgrim accompanied by the Regional Administrator and attended a licensee presentation (IR 87-16)

Appendix H - Management Meeting and
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Date	Sponsor	Topic
04/27/87	Massachusetts Legislature	NRC Region I Administrator and other members of the staff appeared in Boston before the Massachusetts Joint Committee on the Investigation and Study of the Pilgrim Station in Plymouth (IR 87-18)
05/01/87	NRC	Management Meeting at NRC Region I to discuss a surveillance program violation and program weaknesses (IR 87-23)
05/07/87	NRC	1986 SALP Management Meeting at Plymouth, Massachusetts
05/22/87	NRC	NRC Commissioner Carr toured the plant and attended a licensee presentation
05/27/87	Plymouth Board of Selectmen	Four NRC Region I management representatives participated in a public meeting in Plymouth, Massachusetts
06/24/87	NRC	NRC Commissioner Asselstine toured the plant and attended a licensee presentation
06/29/87	NRC	Management Meeting at NRC Region I to discuss the outage status, program improvements and licensee preparations for restart (IR 87-28)

Appendix H - Management Meeting and
Plant Tour Summary

Date	Sponsor	Topic
07/23/87	Commonwealth of Massachusetts	The NRC Section Chief, Licensing Project Manager and Resident Inspectors for Pilgrim met onsite with representatives of the Commonwealth to discuss the NRC inspection process (IR 87-27)
09/09/87	NRC	Enforcement conference at NRC Region I to discuss several security violations (IR 87-30)
09/24/87	NRC	NRC Director of the Office of Nuclear Reactor Regulation, the Region I Administrator and other Senior NRC Managers met with the licensee in Bethesda, Maryland to discuss licensee activities and restart readiness (NRR Meeting Transcript)
09/30/87	NRC	Enforcement Conference at NRC Region I to discuss several Security Violations (IR 87-30)
10/05/87	NRC	NRC Commissioner Bernthal toured the plant and attended a licensee presentation
10/08/87	NRC	NRC Region I Administrator and other senior NRC Managers met at Region I with representatives of the Commonwealth of Massachusetts and two private citizens to answer questions regarding the NRC inspection process (IR 87-45)

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Plant Tour Summary

Date	Sponsor	Topic
10/29/87	Duxbury Board of Selectmen	Four NRC Region I and NRR management representatives participated in a Public Meeting sponsored by the Duxbury Board of Selectmen, Duxbury Emergency Response Plan Committee and the Duxbury Citizens' Committee on Nuclear Matters in Duxbury, Massachusetts
12/08/87	NRC	NRC Region I Administrator toured the plant and met briefly with licensee management to discuss tour observations (IR 87-57)
01/07/88	United States Senator Kennedy	NRC Director of the Office of Nuclear Reactor Regulation and the Region I Administrator appeared before the Senate Labor and Human Resources Committee regarding Pilgrim. The public hearing was held in Plymouth, Massachusetts.
02/18/88	NRC	NRC Region I and NRR managers conducted a Public Meeting in Plymouth, Massachusetts to solicit public comments on the licensee's Restart Plan
02/24/88	NRC	Management Meeting at NRC Region I to discuss the licensee's self assessment process to be used for determining restart readiness (IR 88-10)
03/10/88	NRC	The NRC Director of the Office of NRR and the Region I Administrator toured the plant and interviewed licensee staff regarding the design basis for the Direct Torus Vent Modification (IR 88-07)

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Plant Tour Summary

Date	Sponsor	Topic
04/08/88	NRC	Management Meeting at NRC Region I to discuss the licensee's proposed power ascension test program (Meeting Minutes 88-43)
04/22/88	NRC	NRC Commissioner Carr toured the plant and attended a licensee presentation (IR 88-12)
05/06/88	NRC	NRC Commissioner Rogers toured the plant and attended a licensee presentation (IR 88-19)
05/11/88	NRC	NRC Region I and NRR managers conducted a Public Meeting in Plymouth, Massachusetts to provide responses to comments and concerns on the licensee's Restart Plan raised during the February 18, 1988 Public Meeting (Meeting Transcript)
06/02/88	NRC	NRC Region I Administrator and the Deputy Executive Director for Regional Operations toured the facility
06/09/88	NRC	NRC Commission Public Meeting which included briefings by NRC Staff and BECo
06/27/88	NRC	Management Meeting at NRC Region I to discuss BECo's response to the Maintenance Team Inspection and status of Restart Readiness Self-Assessment actions
08/25/88	NRC	1987 SALP Management Meeting

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Plant Tour Summary

Date	Sponsor	Topic
08/25/88	NRC	ACRS Subcommittee toured facility and received presentation by BECo
08/26/88	NRC	ACRS Subcommittee Public Meeting in Plymouth, Massachusetts, on the proposed plant restart
09/08/88	NRC	ACRS Full Committee Public Meeting in Bethesda, Maryland, on the proposed plant restart

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25870	YELLOW
25871	BLACK
25872	LIGHT BLUE
25873	DARK BLUE
25874	LIGHT GRAY
25875	LIGHT GREEN
25876	SUNBURST
25877	RED
25878	EXECUTIVE RED

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